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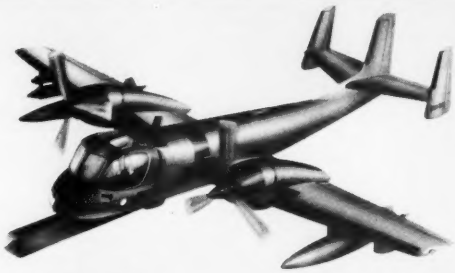

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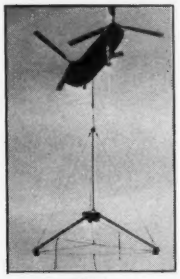

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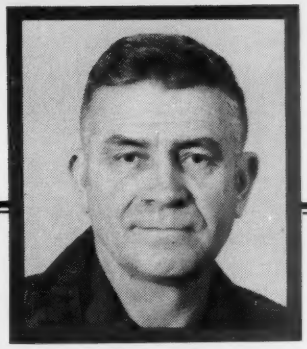
Major General Ellis D. Parker
Chief, Army Aviation Branch



Directorate of Evaluation and Standardization

IN JUNE I had the privilege of recognizing the Army Aviation Center's Directorate of Evaluation and Standardization (DES) for an extraordinary feat. The aviators in that directorate flew 60,000 hours from 1978 to 1984 without an accident. That's an outstanding safety record for anyone, but it becomes even more so when you realize that DES missions are flown throughout the world, in every imaginable kind of environment and weather.

That award for its safety accomplishments provides a springboard for me to acknowledge another DES milestone—the celebration of its eleventh birthday next month. The official organization date is 20 August 1974, which means the Army Aviation Center has had the awesome responsibility of worldwide Aviation standardization for the Army for 11 years. However, the roots of that mission go back much further, because the need for *evaluation* and *standardization* had been recognized early in the life of Army Aviation.

Throughout the years, the evaluation function has been described by various titles and undergone reorganization under several different departments, including the Director of Instruction and the Department of Resident Training Management. Its purpose, however, has not changed significantly since its inception: to maintain quality control by collecting and analyzing data relating to the training programs and providing feedback to the trainers and developers so that necessary corrections and improvements can be incorporated into the programs.

Standardization of Aviation policies and procedures always has been an inherent element of evaluation. Its significance in preventing aircraft accidents resulted in the formal activation of a Standards Division in August 1970, in an effort to achieve flight standardization within the Aviation Center.

In March 1971, various functions of the flight departments were realigned and the Department of Standards and Instructor Training (DSIT) was created, absorbing Standards Division. DSIT assumed responsibility for all aspects of training for flight and academic instructors, as well as standardization of Aviation Center flight and academic training. DSIT also developed policies for the worldwide Army Aviation Standardization Program.

In December 1973, DSIT ceased to function as a flight department and was redesignated as a branch under the newly formed Office of Standardization.

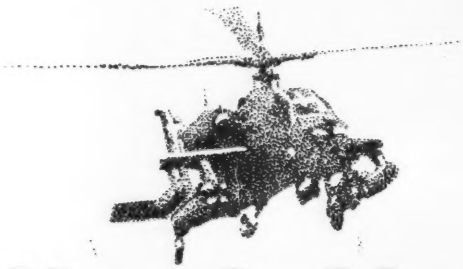
In August 1974, the Aviation Center was chosen as the proponent agency for worldwide Army Aviation flight standardization. The Office of Standardization was changed to the Deputy for Standardization and was charged with implementing this program. Success of the program is reflected by a substantial reduction in aircraft accidents and an increased level of combat readiness.

Evaluation and standardization joined forces in 1976 under the present title of Directorate of Evaluation and Standardization. The mission of DES is to monitor and evaluate Armywide implementation of the Flight Standardization Program and effectiveness of the Aviation Center training programs, resident and nonresident.

DES is currently developing a standardized evaluation program for collective tactical training. This evaluation will continue to assess individual aviator performance but will be oriented primarily toward the integration of individual tactical training with the unit's proficiency in performing its fundamental missions. An effort of this kind will require input from other training departments and could result in the formation of an Aviation Center evaluation team. The objective of collective evaluations will be to improve combat readiness and to return feedback from units in the field to the Army Aviation Center.

Combining Armor, Infantry and Aviation forces into a single fighting maneuver arms team requires detailed planning. This article by Major General Frederic J. Brown, chief, Armor Branch, describes what has to be done in order to accomplish the coordinated effort of the maneuver arms so they will be victors on the air-land battlefield. Next month watch for "The Combat Aviation Brigade In the Light Infantry Division," by Major General John William Foss, chief, Infantry Branch; then in September Major General Ellis D. Parker, chief, Army Aviation Branch, describes Aviation's role in the maneuver arms in his article, "The Challenge of Winning." Last February, Major General John S. Crosby, chief, Field Artillery Branch, covered fire support of the combat Aviation brigade in "Field Artillery and Army Aviation." A copy of Major General Crosby's article can be obtained by writing to Editor, *Aviation Digest*, P. O. Box 699, Ft. Rucker, AL 36362-5000, or call AUTOVON 558-6680 or FTS 533-6680.

Major General Frederic J. Brown
Chief, Armor Branch



Attack Helicopter

Operations on the HEAVY BATTLEFIELD

THERE HAS NEVER been a more exciting time for Army Aviation! Within the year, the first AH-64 Apache attack helicopter battalion will be fielded at Ft. Hood, TX. Its aeroscout counterpart, the OH-58D AHIP (Army Helicopter Improvement Program) is currently undergoing operational testing at Ft. Hunter-Liggett, CA. The first graduates of the Aviation Officer Basic and Aviation Officer Advanced Courses have assumed leadership positions in both H-series and J-series organizations. Army Aviation stands today on the threshold of realizing potential which could only be imagined a few years ago.

With all of its promise, however, there remain many challenges in the field of Army Aviation—the challenge of training our leaders as maneuver arms officers and not as branch specialists, the challenge of developing doctrine and tactics that will exploit the capabilities of both ground and aerial maneuver forces, and the biggest challenge of all—to train and fight Armor, Infantry and Aviation forces together as a maneuver arms team. It is this final challenge that this article will address. The integration of all three of our maneuver assets into a single fighting unit must involve careful planning and coordination both before and throughout the battle. By taking an indepth look at an attack helicopter battalion (AHB) under the operational control (OPCON) of a heavy brigade in Europe, this article serves as a vehicle for demonstrating how we must accomplish this planning and coordination.

Planning to Fight the Maneuver Arms Team

At 071110Z Sep _____ the 1st U.S. Corps was ordered to its initial defensive positions (IDPs). An attack by the Soviets was considered immi-

nent with lead forces of the 7th Guards Army expected to cross the inter-German border within 12 to 18 hours. The 201st Armored Cavalry Regiment (ACR) (+) would receive the brunt of the initial assault in the corps covering force area. The cavalry was expected to delay the enemy for at least 18 hours but for no more than 30 hours.

Within the main battle area (MBA) 1st Corps would defend with two divisions abreast, the 25th Armored Division to the north and the 54th Infantry Division (Mech) to the south. Initially, the 312th Armored Brigade (Sep) would form the corps' operational reserve (figure 1).

The 25th Armored Division commander structured his defense with the majority of the maneuver forces forward. The division would defend initially with the 3d Brigade (-) in the north, the 1st Brigade in the center and the 2d Brigade in the south. The division's reserve consisted of the 25th Combat Aviation Brigade (CAB) (-) and 2-10 Armor. As 1st Brigade sits astride the major enemy avenue of approach into the division sector and because the terrain provides several lucrative engagement areas (EAs) for long-range antitank guided missiles (ATGMs), the division commander has placed one of the CABs two attack helicopter battalions under the OPCON of the 1st Brigade (figure 2).

Upon receipt of his OPCON mission to the 1st Brigade, the commander, 251st AHB (AH-1S) dispatched a liaison officer (LO) to the 1st Brigade to conduct initial coordination with the commander/staff. At the same time he issued a fragmentation order (FRAGORD) to elements of the battalion to prepare to move to the forward assembly areas (FAAs). Upon issuing the FRAGORD, the 251st AHB commander left his executive officer to take charge of organizing and conducting the movement and departed to join the LO in the brigade tactical operations center (TOC). The commander must integrate his force into the brigade plan as early as possible. By including the attack helicopter battalion's assets in the initial planning, the

FIGURE 1

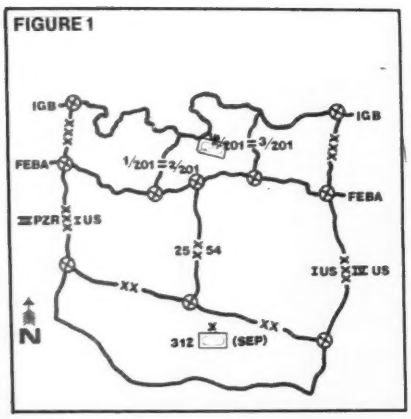
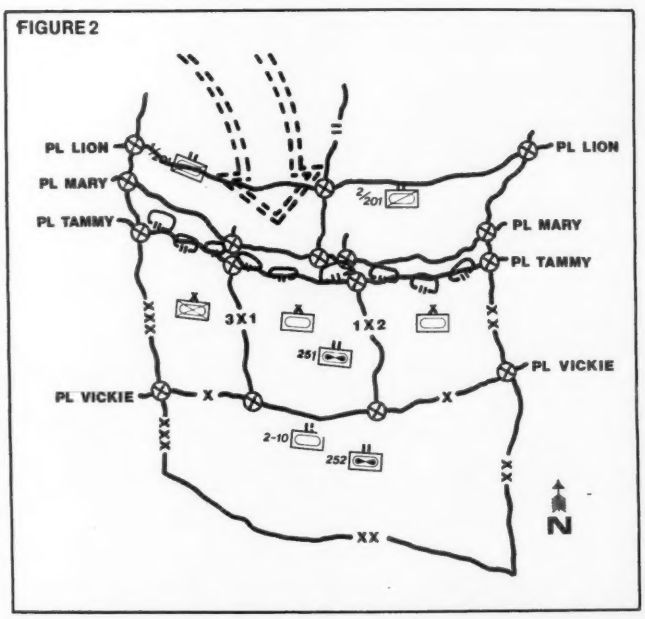


FIGURE 2



251st AHB commander could better advise the brigade on how best to capitalize on the capabilities provided by his unit.

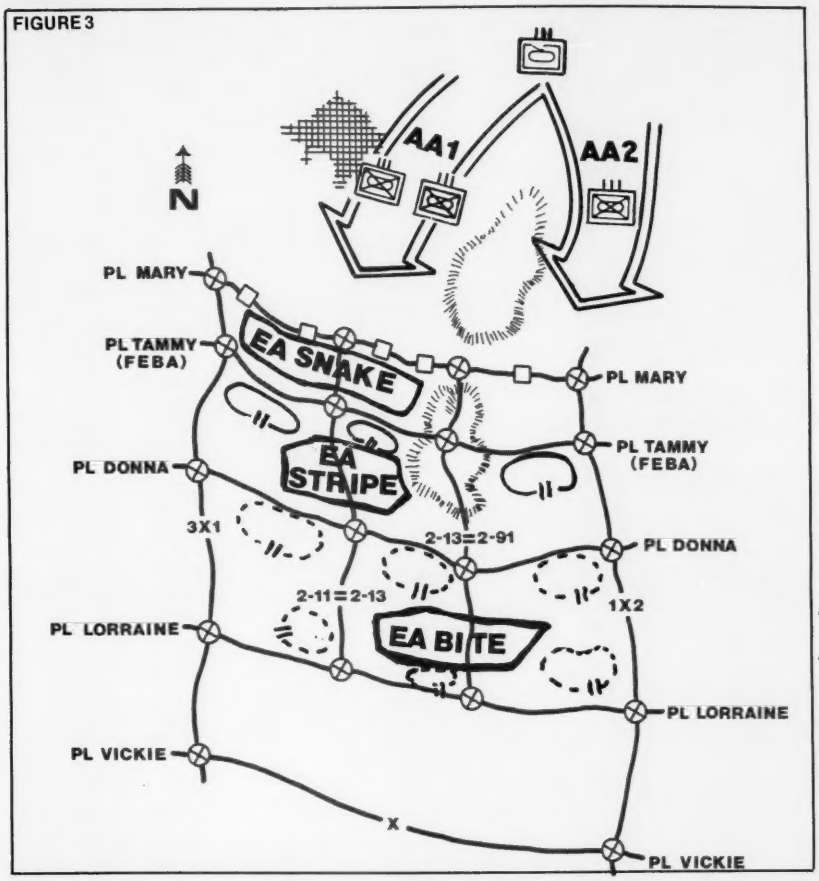
The 1st Brigade commander positioned his forces with two battalions oriented on the enemy's primary avenue of approach (AA1) and his third battalion, TF 2-91, oriented on a secondary avenue of approach (AA2). The enemy is expected to attack with two motorized rifle regiments (MRRs) abreast on AA1 and a third motorized rifle regiment along AA2. A dominant ridgeline just forward of PL Mary serves to canalize enemy forces onto these two AAs while preventing mutual support between the two regiments to the north and the third regiment to the south. Based upon the enemy's doctrine for the attack, the brigade commander expects him to hold his tank regiment in reserve, initially, and to commit that regiment only as success on AA1 or AA2 is achieved (figure 3).

The Brigade Commander's Intent

The brigade commander issued the following guidance to his commanders and staff:

"As I see it, our battle will consist of three phases. First, we have to assist the passage of the covering force and accept the battle handover along PL Mary. To do this it is important that we be able to bring effective fire on enemy elements as they close on PL Mary in order to allow for the disengagement of the covering force elements and maintain those fires as the

FIGURE 3

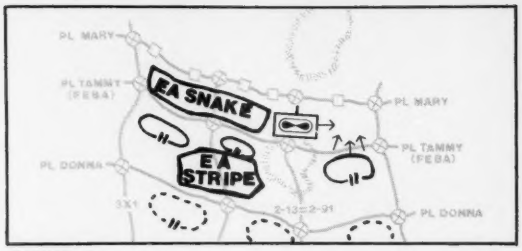


AA—Avenue of Attack
ACA—Airspace Coordination Area
BDE—Brigade
EA—Engagement Area
FEBA—Forward Edge of Battle Area

covering force withdraws. We must make maximum use of long-range ATGMs and artillery to disrupt and delay the enemy during this part of the operation. I have coordinated with the 201st ACR to establish two attack helicopter ambush positions forward of PL Mary to assist in the accomplishment of this phase of the operation (figure 4). I want it understood, however, that these positions are primarily there to observe enemy forces as they move within artillery range, and then to direct artillery fires. Direct fires will only be employed to protect elements of the covering force and just prior to your withdrawal. I've got a couple of reasons for this. First, I want to conserve my aerial firepower for follow-on missions. Second, I want the enemy to be aware that I've got attack helicopters in the area. Thus, when you do open up with direct fires, you've got to be pretty obvious about it, and then you've got to get out of there. Hopefully, this is going to convince the enemy that he needs to bring up his air defense artillery (ADA) where we can get to them.

"Battalion scout platoons need to pick up the covering force at PL Mary and guide them out of our area while we slow the enemy down with artillery and ATGM. By the time the enemy closes to within main gun range [Ed Note: 2,800 meters (m) for planning], I want the covering force elements out of the way. At this point the first phase, battle handover, is complete.

"We will do our first real damage to the enemy once he is across PL Mary. EA Snake provides for an excellent defense. Our battle positions are good both in terms of cover and concealment and in providing fields of fire for tanks and Bradley fighting vehicles. High ground on either side forces the enemy to come to us. The real problem I see with this part of the fight is that TF 2-91 is pretty much forced to fight his own battle.



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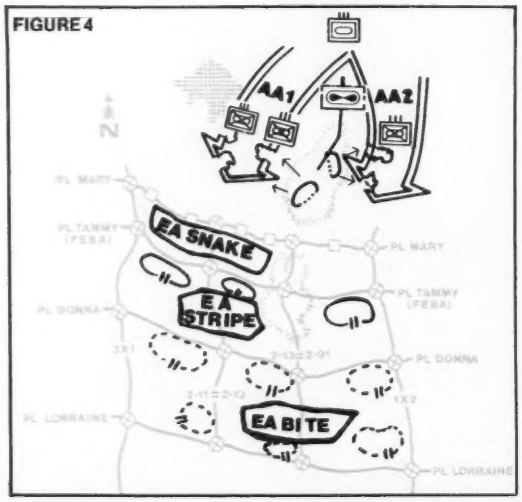


TF 2-11 and 2-13 have got to work together on this one. Ensure that your fire plans and maneuvers support one another. I don't want to try to orchestrate three separate fights. While we can't expect to hold our initial battle positions forever, I do think that we can do a lot of damage. I want the 251st ABH to be prepared to occupy positions on the high ground between TF 2-13 and TF 2-91 with one company on short notice (figure 5). I'll use that company to reinforce the defense in 2-91's sector. What I can't afford is for the enemy to perceive success in 2-91's sector and commit his tank regiment to the south. I'll explain why in just a minute.

"If the enemy gets more than two companies through our obstacles in EA Snake, I want to begin withdrawal to subsequent battle positions. From these positions we can destroy the remainder of the lead regiments in EA Stripe, providing that he doesn't get a chance to employ the tank regiment against us too early. This is where my AHB is going to play its key role in the fight. I believe that by having TF 2-91 hold onto his sector and by withdrawing 2-11 and 2-13, I can convince the enemy to commit his tanks on AA1. Once he has done this, I've cooked up a little surprise for him.

"Once the enemy tanks are committed down AA1, they have to come across this area that I have designated EA Apache (figure 6).

"At this point his elements should still be in march column, just beginning to slow down to assume their preattack formations. If our earlier efforts to force his ADA forward were successful, he will be extremely vulnerable, not only to attack helicopter fires but to close air support (CAS) as well.

"251, I want you to get together with the fire support officer and the air liaison officer and put together a joint air attack team (JAAT) into EA Apache. If at all possible you'll receive priority of fires for the operation. Keep in mind, however, that depending on when I begin my withdrawal, I may need to retain the majority of my artillery to cover the withdrawal of TF 2-11 and TF 2-13.

"TF 2-91, once we make the decision to go after the tanks you've got to suppress enemy forces along Axis Strike—until our forces are clear; that has to be your number one priority. We can't afford to lose 251 en route. If everything comes together, the tank regiment will not be able to influence the close-in battle significantly and we can wrap up the enemy in contact quickly. At a minimum this will allow us to establish ourselves along PL Donna and refit. If possible we'll counterattack to reestablish our positions on the forward edge of the battle area (FEBA)."

Upon completion of the 1st Brigade commander's guidance, the 251st AHB commander expressed concern that the mission to reinforce by fire into TF 2-91's sector would not allow time to rearm and refuel in preparation for the JAAT.

The brigade commander assured him that his concerns had been noted, adding that if it began to look like it would become a problem he would either allow for an early withdrawal of the attack helicopter company (AHC) or conduct the JAAT with only the two remaining companies.

"The problem," explained the brigade commander, "is that if the enemy succeeds in TF 2-91's sector, his tank regiment may be committed south where the terrain is much less favorable for attack helicopter and CAS employment. Thus the priority is to the mission in TF 2-91's sector. The CAS and two AHCs can do what we need done in EA Apache—that is to disrupt and delay the force and prevent his ability to influence the close-in fight. Any destruction we get beyond that is gravy."

Having received guidance from the brigade commander, the AHB commander could now plan his operations to support the brigade scheme of maneuver and the commander's intent. After receiving a copy of the brigade obstacle plan and coordinating for the establishment of his FAAs with the brigade S2, the AHB was ready to move into the brigade area. Three company size FAAs were established about 20 kilometers (km) behind the FEBA (figure 7). At this range the aircraft would be relatively invulnerable to enemy artillery but still close enough to the forward units to react quickly to changes in the battle.

Several other criteria played in the selection of the FAA sites. First the commander of the AHB had selected his command post (CP) location within wire communications range (2 to 3 km) of the brigade TOC. This would ensure reliable communications with brigade throughout the operation. To prevent the creation of a lucrative target for enemy long-range fires, the

commander had to weigh the need for dispersion against the need for effective control and reliable communications. By placing his assets in small, company sized assembly areas, each 2 to 3 km from his command post, their vulnerability was greatly reduced while at the same time reliable communications with each of his subordinate units could be maintained. The forward assembly areas were placed far enough to the rear to preclude the requirement to move assets at the same time attack helicopters were being committed to battle.

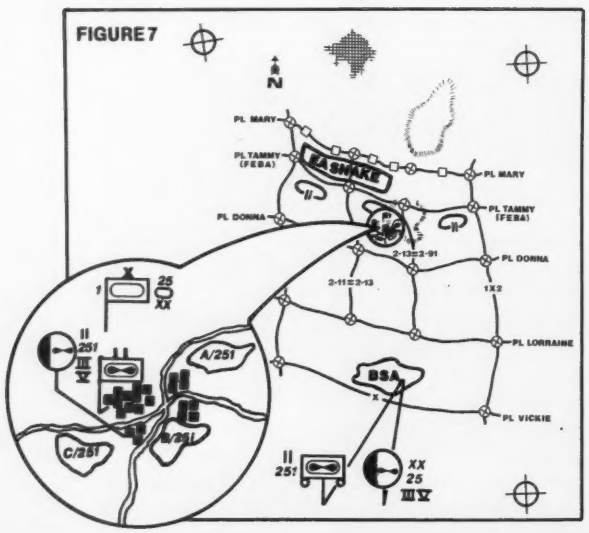
A forward arming and refueling point (FARP) was established in the vicinity of his FAAs to provide the rapid turnaround required upon the completion of his first two missions. A small maintenance contact team was available in the FARP to assist in troubleshooting minor difficulties. The remainder of the AHB's trains elements were colocated with the forward support battalion in the brigade support area (BSA).

The command post itself, consisting of soft skin vehicles, was positioned in a built-up area to reduce vulnerability of the vehicles, mask heat signatures and enhance the staff's ability to operate undetected during hours of darkness.

While the AHB commander and his staff were developing their operations order, his LO remained at the brigade TOC to continue coordination with the brigade staff. Routes to and from the initial ambush position were planned and specific points for aerial passage of lines were designated. PL Mary was established as a restrictive fire line until the withdrawal of the AHC. The biggest airspace management problem for the conduct of the brigade fight involved the JAAT into EA Apache. An airspace coordination area (ACA)* was established which provided for ingress/egress of both the attack helicopter battalion and the A-10s (figure 8). The ACA terminated at 500 feet AGL (above ground level) and became effective only upon order of the brigade commander.

*FC 100-1-103, 15 November 1984, changed ACA to: High density airspace control zone, restricted area/airspace operations zone or an air axis of advance.

FIGURE 7



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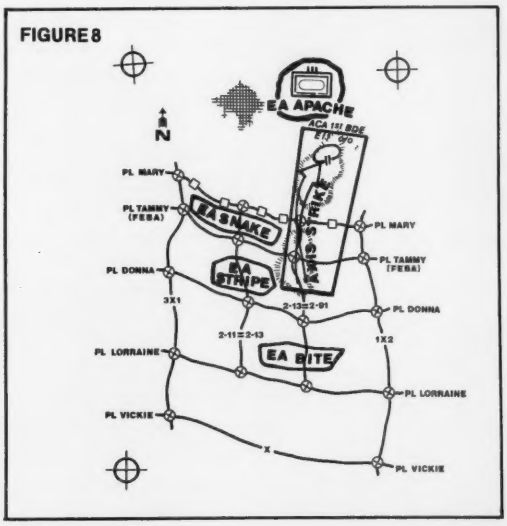


Additionally the AHB LO and the brigade staff exchanged CEOI (Communication-Electronics Operating Instructions) information, emergency signals and standing operating procedures items which would enhance communications and command and control throughout the battle. The LO would continue to operate within the brigade TOC throughout the fight. This would enable him to follow the battle as it developed, to see it "as the brigade staff saw it," and to update the AHB commander on significant actions throughout the brigade area of operations.

The LO discussed each of his three missions with the brigade fire support officers. Targets were identified to support each of the missions. The LO obtained information concerning firing battery locations and fire support frequencies. These would be provided to his own fire support element which would relay the information and refine fire support planning within the AHB.

The LO also discussed his operations with the air defense battery commander supporting the brigade to ensure that his firing elements would be aware of his operations. It was agreed that the air defense weapons status would be weapons hold for all rotary wing aircraft in the brigade sector or in the area of their proposed positions forward of PL Mary.

Once established, fire control measures and air defense weapons status was provided to the division airspace management element for dissemination to other division airspace users.

Of particular interest to the LO was coordination for the movement along Axis Strike. To accomplish this he talked directly to the S3, TF 2-91. During the actual conduct of the movement the lead helicopter company would talk directly to 2-91's left flank company to coordinate direct and indirect fire suppression along the route.

The AHB staff would also follow the battle by "eavesdropping" on the brigade command frequency modulated (FM) net and through interface with the AHB LO. Based upon his analysis of the battle the AHB commander could refine his plan, adjust as necessary and orchestrate ongoing actions to support his operation.

Fighting the Maneuver Arms Team

The first rounds of Soviet artillery impacted upon 201st ACR positions at 080415Z Sep ____. Although combat electronic warfare and intelligence assets had been reporting movement throughout the night, heavy ground fog had greatly decreased the ability of even thermal imaging systems to locate specific enemy forces. Long-range ATGM systems proved virtually useless during the initial hours of the battle with most engagements taking place at ranges of less than 1,000 m. By 0930 the covering force had withdrawn to within a few kilometers of the MBA. Entire troops had been bypassed in the fog and the darkness and were desperately fighting to regain contact with their parent organizations. Those units still intact were attempting to organize an effective defense along PL Lion (figure 2). The ground fog had burned off sufficiently to allow Air Force A-10s and the 252d AHB (Apache) under operational control of the 201st to begin operating. Through effective integration of air/ground maneuver forces and CAS the 201st ACR was able to hold PL Lion for a time, but by 1300 hours the regiment was approaching 60 percent strength and the withdrawal for the covering force was imminent.

Thus, within just 26 hours the 1st Brigade, 25th Armor was committed to battle. A/251st AHB, from its initial ambush position, began directing artillery fires at 1317 hours, reporting at least three motorized rifle battalions (MRBs) in contact with elements of the covering force. An effective mix of smoke and high explosive (HE) allowed the 201st elements to withdraw and move toward their passage lanes.

It was apparent, however, that lead enemy forces had no intention of trying to move forces down AA1. Those forces identified thus far were attempting to bypass to the south along AA2 (figure 9).

The 1st Brigade commander ordered the 251st AHB to engage the lead MRBs immediately in an attempt to turn them back to the north. What had been intended as an ambush had become a full-scale fight. The 251st AHB commander, following the battle from his CP, placed his remaining two companies at REDCON (readiness condition) 1 and prepared to enter the battle. He recommended to the brigade that his entire battalion be committed to slow the enemy forces on AA2, to destroy as much as possible and hopefully to convince follow-on enemy forces that AA1 would be a better choice. The 1st

Brigade commander approved the plan and the 251st AHB was committed in mass (figure 10).

Hasty coordination for attack helicopter battlefield positions and fires was conducted with TF 2-91 as the AHCs moved to occupy positions overlooking AA2. A line just north of PL Mary was established as the western limit for all aerial fires and an air coordination area was established to preclude the possibility of friendly fires impacting in the vicinity of 251's aircraft.

The enemy now found himself in a deadly crossfire from TF 2-91 and 251st AHB. Within the course of a 30-minute battle the initial attack into the 1st Brigade sector had stalled and less than a battalion remained, the 2d echelon regiments of the division had shifted north and were moving toward AA1.

The 251st AHB had, at this point, however, expended its onboard ammunition and was forced to recover to the FARP to rearm, refuel and refit. For the next 40 minutes the 251st AHB would remain out of the fight (figure 11).

A second enemy MRR closed on TF 2-11 and TF 2-13 and was taken under direct fire as it entered EA Snake. An effective obstacle plan and indirect fires helped to delay the enemy within the engagement area while elements of the two task forces used direct fires to destroy tanks, command and control vehicles and mobility enhancing vehicles. But, the third MRR of the division was closing rapidly and the brigade commander elected to begin withdrawing his forces to battle positions close to PL Donna.

TF 2-91 was first instructed to seize the high ground between TF 2-13 and TF 2-91 to prevent the possibility of a gap developing as the remainder of TF 2-91 held. Forces in contact with TF 2-91 at this time were minimal, consisting of remnants of the 1st Regiment.

As TF 2-11 and TF 2-13 began their withdrawal, the enemy motorized rifle division commander, sensing a withdrawal throughout the sector, attempted to create a breakthrough along a cross compartment between TFs 2-13 and 2-91.

The enemy's attempted move to the south created a gap in his forces, paving the way to commit the 251st AHB into EA Apache. A-10s moved

FIGURE 9

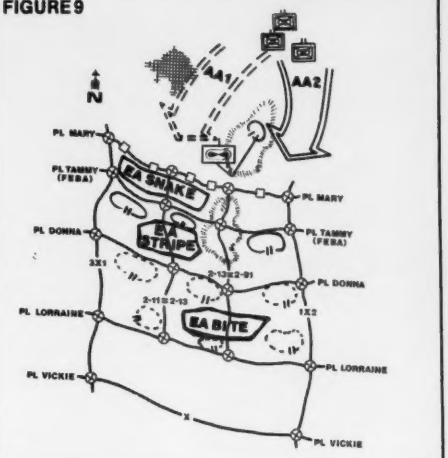


FIGURE 10

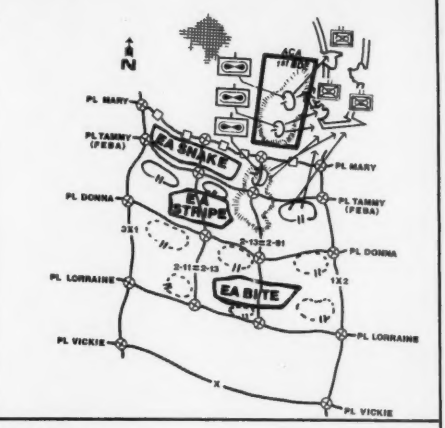


FIGURE 11

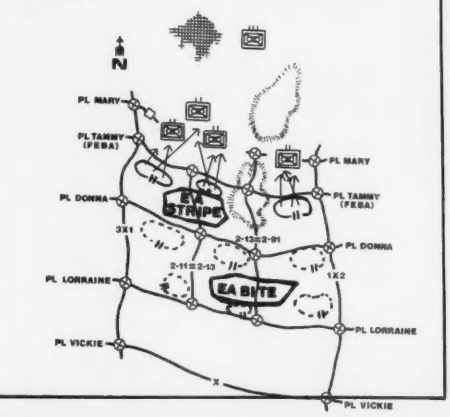


FIGURE 12

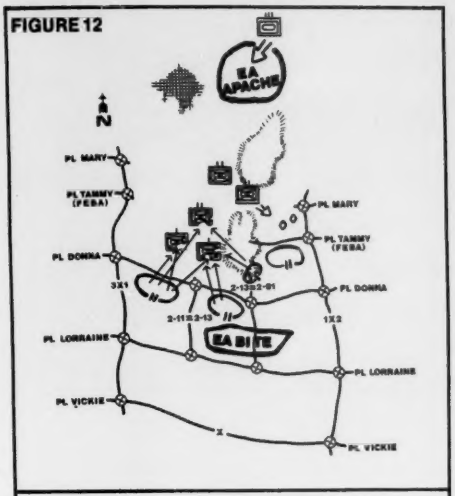
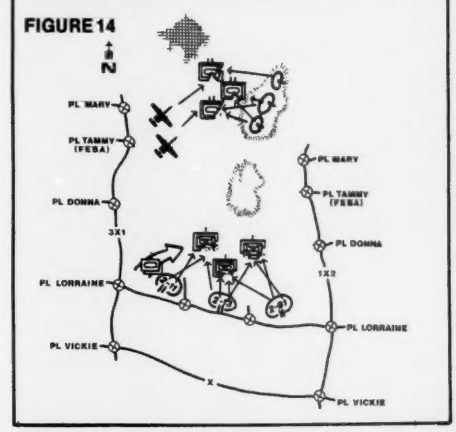


FIGURE 13

FIGURE 14



from loiter positions and the joint air attack was underway. As the brigade commander was unable to provide priority of artillery for the conduct of JAAT one company of 251 carried a full load of 2.75 inch rockets to augment the team's suppression of enemy air defense (SEAD) capabilities. With the additional capability of the Hydra-70 Rocket, the AH-1S can effectively accomplish the SEAD mission employing smoke, HE and DPICM (dual-purpose improved conventional munitions) in combination. In a target rich environment, the accompanying decrease in the amount of fuel available, and thus time onstation, is not a significant problem. Having lured the enemy tank regiment into EA Apache, the 1st Brigade commander ordered the withdrawal of TF 2-91 to PL Donna. The AHB commander and the brigade air liaison officer orchestrated the JAAT, keeping the ground maneuver commander abreast of their action on the brigade command FM, thus freeing the brigade commander to concentrate on the close-in battle.

A-10s and attack helicopters continued engaging the enemy tank regiment, attriting and delaying the force and providing time for the ground maneuver commander to complete the destruction of enemy forces in EA Stripe. What remained of the tank regiment did not provide sufficient combat power to continue the attack. 1st Brigade had successfully defended its sector and more important, time was now available to evacuate casualties, rearm and refuel fighting vehicles and prepare for the next battle.

Summary

The scenario depicted here is not based on "Star Wars" equipment or concepts. Rather it represents a battle which could occur tomorrow with current equipment. Our challenge is to train today with what we have, to develop the ability to plan and execute and to react rapidly to changes in the battlefield environment. We have come a long way in providing the vehicles to meet this challenge. Battle drills, standardized load plans and mission training plans common to the armor/mechanized force are being produced and distributed now. We must continue our efforts in this direction, expanding our focus to include the Aviation arm. Working together as a maneuver arms team we will fight and win the air-land battle.

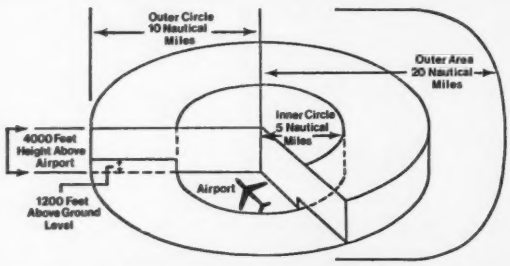
Airport Radar Service Area

Mr. Lingiam Odems
U.S. Army Aeronautical Services Office
Cameron Station, Alexandria, VA

THERE ARE control zones, terminal control zones, airport traffic areas, terminal radar service areas (TRSAs) and now—our newest addition, *airport radar service area* (ARSA). While only three have been established so far (Baltimore, MD; Columbus, OH; and Austin, TX), every TRSA serviced by a Level III, IV or V radar approach control facility is a candidate to become an ARSA.

An airport radar service area consists of controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to the operating rules, pilot and equipment requirements specified in FAR 91.

The ARSA is described in FAR 71-14. Dimensions: ARSA airspace consists of two circles, both centered on the primary/ARSA airport. The inner circle has a radius of 5 nautical miles (nm). The outer circle has a radius of 10 nm. The airspace of the inner circle extends from the surface of ARSA airport up to 4,000 feet above the airport elevation. The airspace area between the 5 nm and 10 nm rings begins at 1,200 feet above ground level and extends to the same altitude as the inner circle. To complete the picture, there is an *outer area*: the normal radius of the outer area will be 20 nm. It extends outward from the primary/ARSA airport and extends from the lower limits of radar/radio coverage up to the ceiling of the approach control delegated airspace, excluding the inner and outer circle and other airspace as appropriate. The foregoing are the basic standard designs for ARSA and outer areas; however, there will be minor site-specific variations throughout the system. ARSAs are charted on sectional charts and some terminal control area charts. NOTE: ARSA altitudes are expressed in mean sea level.



Mandatory participation is required of all aircraft operating in an ARSA; therefore, two-way radio communication is required and must be maintained. Upon establishing two-way radio communication and radar contact, pilots can expect to receive services such as sequencing of all arrivals, IFR/IFR standard separation, IFR/VFR traffic advisories and conflict resolution, VFR/VFR traffic advisories.

In the outer area these same services are provided when two-way radio communication and radar contact are established; however, while VFR participation is not mandatory, it is strongly encouraged. Within the ARSA and the specified outer area, traffic advisories will be provided as a primary duty of the controllers and not as an additional service.

Beyond the *outer area* (within the delegated airspace of the approach control) services include standard IFR separation, basic radar service, Stage II (where designated) and safety advisories as appropriate.

Remember—ARSA operations mean that all arriving and overflight aircraft *shall* establish two-way radio communication with ATC prior to entering the ARSA airspace. All aircraft departing from satellite airports/heliports outside the ARSA surface area (inner 5 nm) *shall* establish two-way radio communication with ATC prior to entering the ARSA airspace.

All aircraft departing from a satellite airport/heliport within the surface area of the ARSA *shall* establish two-way radio communication with ATC as soon as possible. Meanwhile, pilots must comply with approved traffic patterns when departing these airports.

Specific questions concerning ARSA should be directed to Mr. Lingiam Odems at AUTOVON 284-7796/6304 or Commercial (202) 274-7796/6304.

Readers are encouraged to address matters concerning air traffic control to: Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22304-5050.

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Cobra Survival Kit

We have received several calls lately in reference to the survival kit for the AH-1 Cobra. The original article by CW3 John P. Goodrich and CW2 Bryan D. McClendon appeared in the November 1982 issue of* Aviation Digest. *AVSCOM along with Natick Laboratories is continuing to address all Army helicopter survival kit needs. We are hoping to have a new modular survival kit to the users in fiscal year 1987.

AMERICAN ingenuity is a byword that often applies to Army Aviation people. Two who have laid claim to it are Chief Warrant Officer, CW3, John P. Goodrich and Chief Warrant Officer, CW2, Bryan D. McClendon.

Both are AH-1 Cobra pilots and unit safety officers—CW2 McClendon for Company C, 229th Attack Helicopter Battalion, Ft. Campbell, KY, and CW3 Goodrich for Company D, 7th Combat Aviation Battalion, Ft. Ord, CA.

Their realization that the aircraft they fly has no space for survival gear, other than what can be stuffed into the individual's vest, was not unique. That knowledge is shared, and dreaded, by every Cobra pilot.

Referring to the lack of gear to use in case of an accident or forced landing, CW2 McClendon said, "It is tragic enough to die in combat, but that is the price for peace. It would be a real heartbreak to have someone die in peacetime because of a lack of equipment."

So in separate and independent efforts, the chief warrant officers determined to find a solution to the problem; and they came up with the same ingenious idea: for any Cobra (or other aircraft) with a TOW configuration, use an empty TOW tube as a storage place!

CW3 Goodrich uses the designator TUSK for his TOW tube survival kit. Items he placed in the kit for the Ft. Ord environment are shown in the accompanying diagram and listing, and the total weight is 38 pounds.

Preparation of the tube is vital, he said: "Wash and clean the TOW tube, then paint or otherwise seal it. Next, cut out two aluminum disks to seal the ends of the tube, coating the disk edges with rubber silicone to ensure a water-tight fit. Then reinstall the tube's original flange and flange retaining device, along with the disks.

Frances Kirkland photo by Jeffrey Lewis

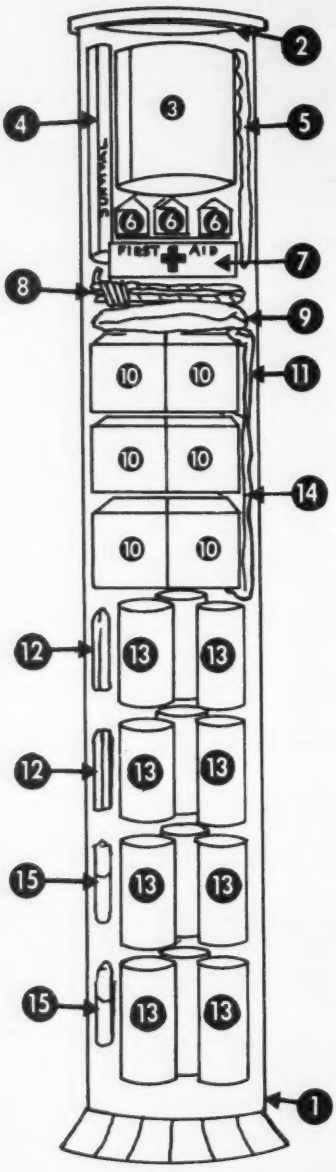
"The contents of the TUSK can easily be modified to meet the requirements of many different operating environments and missions. Development of a wing-strap device is underway so that the TUSK does not occupy a space needed for a missile when operating in a tactical environment."

CW2 McClendon also agrees that the TOW tube survival kit will have to be put in another location if a mission dictates full missile capability.

The only structural change this invention requires for the TOW tube cannister is the removal of the electrical wiring connector from inside the tube.

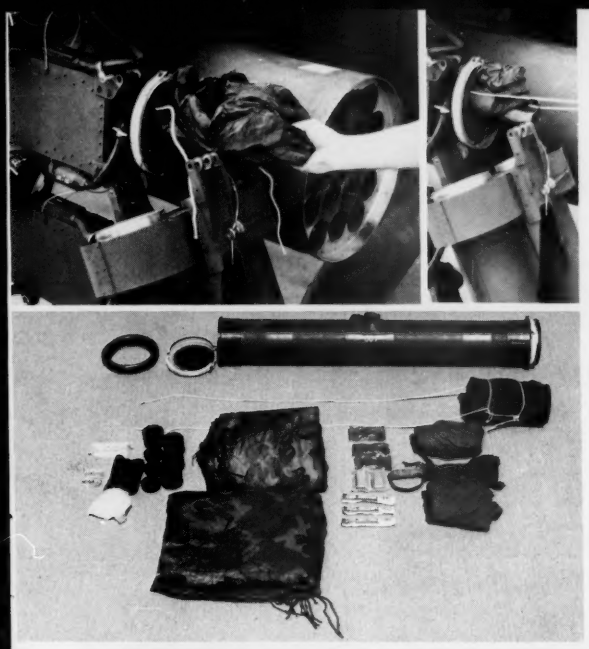
He said, "Each survival kit is numbered so that control can be kept over it for inspection and

PEARL'S



The Cobra survival kit, TUSK, designed by CW3 John P. Goodrich (left), is depicted by a diagram showing how items are packed in the TOW tube, a list of contents with corresponding item numbers, and a picture of those contents. SGT Joseph L. Freeman looks on.

Item Number	Item and Quantity	NSN
1	Expended TOW tube, 1	
2	Aluminum disk, 2	Local manufacture
3	Tarpaulin, 1	8340-00-485-3012
	Hat, sun, 1	8415-00-270-0229
	Bag, drinking water storage, 1	8465-00-485-3034
4	Air Force Manual (AFM) 64-5, 1	
5	Tool kit, survival, 1	8465-00-973-4807
6	Candle, 4	6260-00-840-5578
7	First aid kit	
	Zip lock plastic bag, 1	8105-00-837-7755
	Bandage, gauze, compressed, 3x6 yards, 1	6510-00-200-3185
	First aid kit, eye dressing, 1	6545-00-853-6309
	Bandage, muslin, compressed, 37x37x52,1	6510-00-201-1755
	Dressing, first aid, field, 4x7, 1	6510-00-159-4883
	Povidone iodine solution, 1	6505-00-914-3593
	Water purification tablets, iodine, 1	6850-00-985-7166
	Ammonia inhalant ampul, 3	6505-00-106-0875
	Bottle, safety cap	6530-00-112-0160
	Bandage, 18	6510-00-913-7909
	Chapstick, hot weather, 1 tube	6508-00-116-1473
	Gauze, petrolatum, 1 pkg.	6510-00-202-0750
	Preparation, sunburn preventive, 1 bottle	8415-00-938-6231
8	Parachute cord, 50 ft.	
9	Accessory packet	
	Zip lock plastic bag, 1	8105-00-837-7755
	Plastic spoon, 1	7340-00-170-8374
	Matches (nonsafety), 1	9920-00-985-6891
	Pocket knife, 1	5110-00-162-2205
	Waterproof match box, 1	8465-00-265-4925
	Wire, nonelectrical, 20 ft.	9525-00-596-3498
	Can opener, 1	
	Whistle, ball, plastic, 1	8465-00-254-8803
	Aluminum foil, 6x3 ft, 1	
10	Food packet, survival, 6	8970-00-082-5665
11	Headnet, insect, 1	8415-00-935-3130
12	Trioxane fuel, compressed, 3	9110-00-263-9865
13	Water, canned drinking, 12	8960-00-243-2103
14	Kit, fishing tackle, 1	7810-00-558-2685
15	Signal, distress, day/night, 2	1370-00-309-5028
	Zip lock plastic bags (for distress signals), 2	8105-00-837-7755



The survival kit above was designed for AH-1 Cobra with TOW by CW2 Bryan D. McClendon. TOP LEFT: After removing the security bolt with a pocket knife, it only takes 30 seconds to get the contents out of the tube. TOP RIGHT: Even the items in the rear of the tube are easily accessible with the pull cord. ABOVE: The contents of the survival kit are adequate for two aviators.

maintenance. The tube is secured on the helicopter by simply placing a lock on the missile arming lever. That lock is removed before flight and the key kept in the logbook along with the door key. Securing the tube also relieves the crew from carrying it to and from the aircraft." (This is the same method used by CW3 Goodrich to secure the TUSK.)

The packing list for CW2 McClendon's survival kit includes two blankets, two ponchos and liners, knife, candles, chemical lights, nylon rope, copper wire, C rations and an opener, plastic bags, trioxane fuel tablets, matches and PRC-90 batteries.

Both inventors said the kits have been carried on Cobras in their respective units on training missions and that pilots have unanimously agreed the kit's presence adds to their peace of mind.

Action is underway within AVRADCOM to address all Army helicopter survival kit needs. Until the bright day arrives when the new module is available, however, two Army aviators have offered a workable interim solution.

AN/PRC-90 Requirements in AR 95-17

Paragraph 2-9b of AR 95-17 requires each aircraft crewmember to be equipped with a survival radio. Because of the critical shortage of PRC-90s and the long repair turnaround time, complying with this requirement became an impossibility. DALO-AV message, 072040Z Nov 84, subject: Delayed Implementation of Para 2-9b, AR 95-17, delayed the implementation of this paragraph until 15 May 1985. DALO-AV further delayed implementation of paragraph 2-9b, AR 95-17 until 15 November 1985 with their message dated 031845Z May 85, same subject. In the interim, the pilot in command will continue to ensure that not less than one fully operational survival radio is onboard the aircraft during each flight. This does not preclude other crewmembers from carrying additional radios onboard the aircraft when assets are available. Department of the Army point of contact is CPT (P) Lou Bonham, DALO-AV, AUTOVON 227-0487.

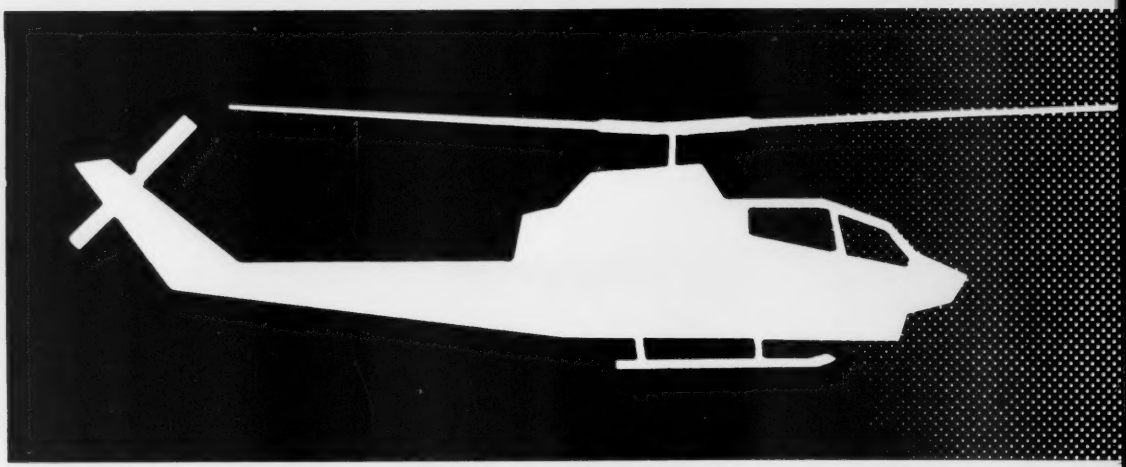
U.S. Air Force Survival School Wants Your Story

The U.S. Air Force Survival School wants your survival episode. If you have been involved in a survival situation, regardless of the length of time or circumstances, we would like to know about it. Send a brief synopsis of your experience in either handwritten or typed format. Include your organization and AUTOVON or commercial telephone number. The instructor cadre will use your story as motivational and support material during its teaching presentations. Also let us know if we can interview you. For further information, write MSGT Edgar, 3636 CCTW/DOV, Fairchild AFB, WA 99011-6024; or call him at AUTOVON 352-2371/2171.

Film, Camouflage, Jungle and Desert—Unauthorized Use (Correction)

I refer you to the article with the same subject as above in the February 1985 issue of *Aviation Digest*. There was an error made in where the Aviation life support equipment (ALSE) maintenance personnel work. The article should state, "Maintenance personnel at U.S. Army Aviation Systems Command (AVSCOM)" instead of U.S. Army Troop Support Command. The points of contact and telephone numbers are the same. Our apologies to Mr. Angelos and AVSCOM Directorate for Maintenance.

If you have a question about personal equipment or rescue/survival gear, write PEARL, AMC Project Officer, ATTN: AMCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798 or call AUTOVON 693-1218/9 or Commercial 314-263-1218/9.



From helicopters

The transition process

By James L. Hill

The views expressed in this article are those of the author and not necessarily those of the Department of the Army or the Army Safety Center.

NEW DEVELOPMENTS in design and technology have produced Army aircraft with greatly increased capabilities. While the sophistication of the equipment places more demands on pilots, the Army aviator is essentially the same basic model we had 40 years ago when flying was somewhat simpler. There is a distinct possibility that in some instances we expect too much too soon from aircrews.

One area that bears a closer look is transitioning rotary wing aviators into fixed wing aircraft.

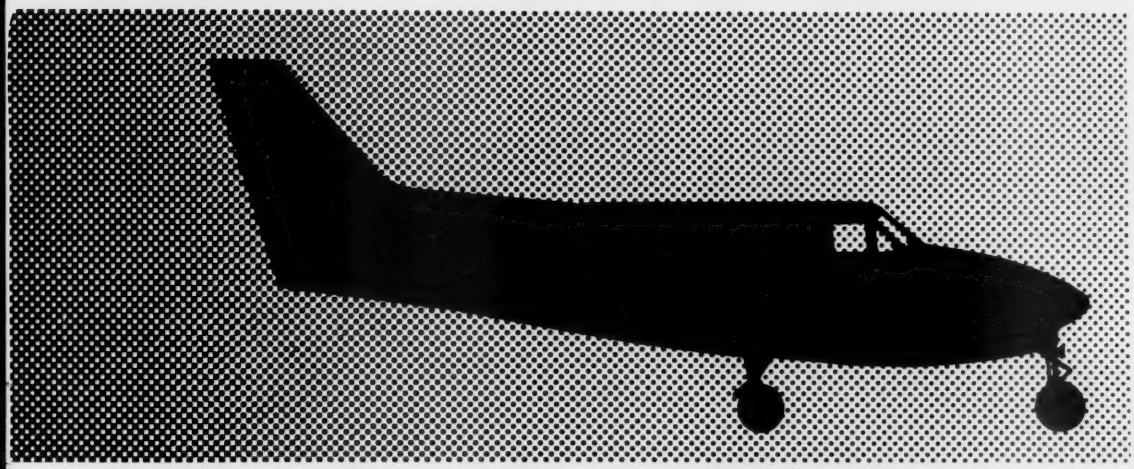
The experience level of most fixed wing aviators is much lower today than during the Vietnam era. The average fixed wing pilot has about 300 hours of flight time although he may have thousands of hours in rotary wing aircraft. One reason for this is that the Department of the Army has for some years had no initial entry fixed wing courses; rotary wing aviators transition into fixed wing aircraft.

The Army provides school training for pilots transitioning into the T-42 Cochise and OV-1 Mohawk. However, aviators transitioning into the T-42 today receive less hands-on training than those who trained in the 70s. Transition training into the U-21 Ute and C-12 Huron is the responsibility of the local Aviation unit.

Problems sometimes arise when an experienced rotary wing aviator transitions into aircraft in which he is relatively inexperienced. There is a psychological adjustment that the aviator himself must make. One characteristic of a good pilot is confidence in his ability. He expects, and is expected, to "measure up." This can lead to a can-do attitude, which is an asset in most circumstances, but which can be the opposite in transition training.

Take, for instance, the aviator, who believes that if he can fly a helicopter, he can fly anything. When he is taken out of that familiar environment and placed in the cockpit of a fixed wing aircraft, he may become overconfident before his experience catches up with his belief in his capabilities. The fact that a fixed wing aircraft is aerodynamically stable compared to a helicopter can contribute to that overconfidence.

Many times, high-time rotary wing pilots are assigned fixed wing missions that are not commensurate with their fixed wing experience. Adding to this the possibility of unsatisfactory unit training or standardization increases the odds for a mishap. The result can be hazardous Army flying operations. This is not a reflection on the aviators; it simply means that they



; to airplanes

U.S. ARMY SAFETY CENTER

must be given adequate time (training flight hours vs. training on mission) to transition into aircraft in which they lack experience.

Aviators must always be aware that proficiency is a direct result of knowledge, skill and practice. But it is also important to be aware that these contributors to proficiency must take place under the right tactical and environmental conditions.

The most obvious basic differences in fixed wing and rotary wing flying are that helicopters fly slower and lower than fixed wing aircraft and usually operate within 150 miles of their home base. The fixed wing aviator may fly up to 1,500 miles in one day through a variety of airspace, altitude and weather conditions.

This means that rotary wing aviators have less weather experience than their fixed wing counterparts. Average helicopter pilots with 10 to 15 years of flight time may have less than 100 hours of weather time. Unless they have made a consistent effort to get instrument experience and to maintain proficiency, they will be at a real disadvantage when they transition to fixed wing aircraft. This, too, can become a psychological factor, particularly with older, experienced rotary wing aviators.

An aviator who is accustomed to the slower speeds and lower altitudes of rotary wing aircraft must retrain himself to think and react to a different kind of flying. That does not mean that rotary wing experience can't be transferred to fixed wing, but an aviator must be able to judge objectively which experience applies in a particular aircraft and environment.

One phase of fixed wing flight where experience is critical is landing. An aviator may be an instrument instructor in the UH-1 Huey, but before he can fly an instrument landing system (ILS) approach in an OV-1 or C-12 with the same degree of proficiency, he must have time to gain experience. A fixed wing aircraft in the final phase of an instrument approach is flying much faster than a helicopter. As the pilot attempts to configure the aircraft for landing, more requirements may occur than he is able to meet. Excessive demands made on the aviator before he is adequately experienced may cause him to "fly behind the airplane." As he falls farther and farther behind, the possibility for a mishap increases. This same sort of situation may have contributed to the following mishap involving two recently transitioned rotary wing pilots.

Background

The U-21 had taken off before daybreak under instrument flight rules (IFR) on a service support mission. Weather at destination was within authorized filing minimums, although radiation fog was forecast. Fog in that area, at that time of year, was not unusual.

Although weather was below published minimums by the time they reached their destination, the pilot elected to make a straight-in precision approach radar (PAR). By the time the aircraft passed the glide

slope intercept point and the locator outer marker, the approach procedures and tasks required to configure the aircraft for landing had apparently exceeded the experience and ability of the crew. As cockpit requirements rapidly increased, the crew appeared to be "flying behind the airplane." They had allowed the aircraft to drift off course and to descend below the published decision height.

When the pilot failed to sight the runway, he was told he was below the glidepath and left of course. He decided to make a go-around and proceed to the locator outer marker and hold. The ground controlled approach controller instructed him to execute missed approach procedures. The pilot continued with the go-around. A few seconds later, the aircraft hit the tops of trees; it continued in a diagonal descent through the trees until it hit the ground. The crew and passengers were killed, and the aircraft was destroyed.

Accident causes

The primary cause of this accident was human error; the pilot let the aircraft descend below the authorized decision height. It is assumed his error was not an intentional violation of established flight rules. It was a result of inadequate training, poor or improper crew coordination and/or preoccupation with other duties. The flight crewmembers apparently exceeded their individual and crew capabilities during the attempted approach.

In any flight there are critical decision points. An aviator who has had adequate training and practice will be able to anticipate the need for a decision, consider alternatives and select a course of action. Anticipation increases the probability that he will select the best course of action. In fact, adequate anticipation may eliminate entirely, or at least reduce, the need to make urgent decisions.

A poor decision, even one made in the planning stages of a flight, may have multiple effects later. This is especially true in fixed wing aircraft operating in poor weather conditions.

There were a number of critical decision points in this flight, from the initial planning to the final decision to attempt a go-around.

The first critical decision point was whether to conduct the flight. The alternatives available to this aircrew were to go ahead as scheduled, depart earlier, delay the flight or cancel.

In the area where the destination airfield was located, fog normally prevailed at that time of year, especially just before daybreak—the time they were scheduled to arrive. The weather forecast and the crew's knowledge of basic weather phenomena should have told them that fog was probable. When surface winds are 3 to 5 knots, fog will lift into a low overcast condition. Otherwise, the fog will probably remain static until the temperature increases and it burns off or the dewpoint spread increases.

If they had arrived an hour earlier or an hour later, they would have had a better chance of finding runway visual range (RVR) landing minimums. Breaking out at minimums would have been much more likely, or they could have held on arrival until conditions improved.

They decided to continue the flight as scheduled.

The second critical decision point was when the pilot was given the weather at destination and decided to initiate the approach. He did not violate AR 95-1: "Army Aviation: General Provisions and Flight Regulations," and he was well within the capabilities and limitations of the aircraft. The chances of breaking out at minimums, however, were practically zero. With the conditions that existed at the destination, the pilot, looking down the approach end of the landing runway, would not be able to see the lights.

The third critical decision point came when the pilot decided to continue the approach after passing the glide intercept point in the vicinity of the locator outer marker. Configuring an aircraft for landing during the final approach phase of a PAR is difficult even for an experienced fixed wing pilot. The rate of descent requires almost idle

The average fixed wing pilot has about 300 hours of flight time although he may have thousands of hours in rotary wing aircraft.

power to dissipate airspeed enough to allow a safe landing gear extension and keep the aircraft on the glide scope. The aircraft was traveling much faster than the pilot was accustomed to, and there is a strong probability that a low-time fixed wing aviator in these circumstances would be flying behind the aircraft at this point.

The fourth and final critical decision point was when the pilot was informed he was at the decision height. His altimeter confirmed this, yet he failed to make a timely decision to execute the assigned missed approach.

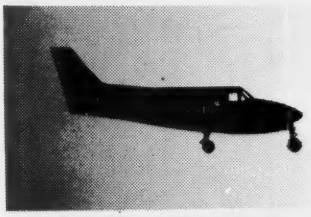
Decision height is the most critical point of the approach. At most airfields, the decision height for a PAR is 200 feet above ground level; some may be 100 feet. There is less obstacle clearance for a PAR than for a nonprecision approach and little margin for error. A pilot who has difficulty maintaining within 100 feet of his altitude at cruise flight will likely have even more problems under instrument meteorological conditions at night with limited visibility.

The configuration of an aircraft taking off or landing usually means induced drag and/or maximum performance from power plants. The aircraft is also operating closer to the ground and at lower airspeed. To be indecisive or behind the aircraft under these circumstances can be disastrous.

A missed approach, especially under IMC at night, is a critical phase of flight to most pilots. These circumstances demand that the crewmembers be able to anticipate requirements, make decisions, and coordinate their actions.

These flight crewmembers either failed to realize the immediate threat when the aircraft was allowed to descend below decision height and drift off course, or they were unable to fly the aircraft with the precision conditions required.

Another factor which may have indirectly contributed to this mishap is that change 2 to AR 95-1 authorizes Army pilots to initiate a straight-in instrument approach regardless of ceiling and visibility. (It does not, however, authorize descent below the published decision height unless the runway is in sight.) The regulation had previously required at least the published prevailing visibility or runway visual range (RVR). Under this rule, when RVR was published with prevailing visibility, the RVR would be the controlling visibility factor.



Air Force Regulation 60-16 requires pilots to have published landing visibility for a straight-in approach. Some Air Force commands are even more restrictive. The Navy permits dual-controlled aircraft with two pilots to initiate a straight-in approach in accordance with NATOPS regardless of the visibility conditions. However, some naval units have added restrictions to this minimum. Authorizing Army pilots to "take a look" creates a potential hazard. When the weather is below published landing minimums, pilots should not have to second-guess the weather and attempt the approach. The number of successful landings that have been made in weather below landing minimums does not justify the risk of a mishap. **There are weather conditions in which we simply should not attempt to fly.**

Some pilots support the idea that landing weather minimums should be at the discretion of the pilot in command. They believe that common sense would prevail in most situations. But common sense, unfortunately, is not as common as we might like to think. Life or death decisions based on common sense is risky business. There are some pilots who will break the rules regardless of what regulations stipulate. The majority, however, are disciplined enough to follow established flight rules and regulations. The Army should provide pilots adequate guidance for operating aircraft, especially for takeoffs and landings.

This article is not intended to question the competency or integrity of Army aviators. Its purpose is to point out some of the things we should consider about transition training from rotary wing to fixed wing aircraft. Regardless of their rotary wing experience, we owe aviators the opportunity to gain fixed wing experience—including weather and landing procedures—before we expect them to fly missions that push them and their aircraft's capabilities to their limits. If we do not couple experience with the mission, the aircraft may get ahead of them regardless of their flying skills. If that happens, as the demands of flying escalate in critical phases such as approach and landing, we may well lose still more crews and their aircraft.

About the Author

James L. Hill was an investigator in Directorate for Training Developments, Investigation and Education, U.S. Army Safety Center, at the time he wrote this article. He is now a safety specialist with the U.S. Army Air Defense Board, Fort Bliss, TX.

Hill's military career spanned 31 years and included combat service in the Korean War and Vietnam. A Master Army Aviator, Hill entered flight training in August 1966. He has logged 4,500 flight hours and has never had an accident. He is qualified in the UH-1, U-21, C-12, T-42, as well as the Piper Navajo and Aerostar and the Falcon 20.

His awards include the Combat Infantry Badge, Purple Heart (1st Oak Leaf Cluster), Meritorious Service Medal, Air Medal, Joint Service Commendation Medal, and Korean Service Medal.

AVIATION PERSONNEL NOTES

Enlisted Soldiers Review OMPF

In 1984, more than 9,000 soldiers visited the records review room at the U.S. Army Enlisted Records and Evaluation Center, Ft. Benjamin Harrison, IN, and large numbers continue this year. Visitors can see their Official Military Personnel File (OMPF) on microfiche and get their questions answered. Copies of documents authorized for file in accordance with AR 640-10 which are missing from OMPF are accepted for update. The review room located in Room 107AA of Building 1 at Ft. Harrison is open from 0730 to 1500 hours Monday through Friday. An APPOINTMENT IS REQUIRED in order to assure record availability. Appointments may be obtained by telephone—AUTOVON 699-3361 or commercial (317) 542-3361. A copy of the same microfiche OMPF provided to enlisted soldiers who go to the records review is available by mail. This service is provided free of charge by writing to Commander, U.S. Army Enlisted Records and Evaluation Center, ATTN; PCRE-RF-I, Ft. Benjamin Harrison, IN 46249-5301. Written requests must include name, social security number, grade, mailing address and must be signed by the requestor.

School Ban For Overweight Soldiers

Paragraph 19D(2) of AR 600-9 states that overweight personnel will not be able to attend professional military or civilian schooling; however, AR 600-31 and other Army regulations limit this disqualification to professional development schooling.

The change in policy, effective 1 April, is to disqualify overweight personnel for all military and civilian schooling beyond initial training. Initial entry training includes basic branch course or equivalent for officers and basic training, advanced individual training, one station unit training and one station training for enlisted personnel. Army regulations will be changed to reflect this change in policy.

In those cases where overweight personnel report for a course, the following actions will occur:

- Permanent change of station (PCS) students will be given 30 days probationary period to meet the weight standard. If standards are not met, the student will be considered a failure and an appropriate academic evaluation report rendered. The student will be reported to the appropriate career division for assignment instructions.
- Temporary duty (TDY) and return students will be denied enrollment and returned to their units.
- Students on TDY en route to a PCS assignment will be denied enrollment and will be reported to the appropriate career division for determination if they should continue to their new unit or be diverted to another assignment.

All commanders should initiate stringent enforcement procedures to ensure that a soldier is within the weight limits before allowing the soldier to proceed to a military or civilian course.

Enlisted Preference Statement

The new preference statement, DA Form 2635, is dated August 1984. This form is very important to the assignment system. Soldiers who complete it accurately and submit it early improve their chances and their families' of being assigned to a desired location.

The new form contains items about spouse employment, the Exceptional Family Member Program and the Married Army Couples Program.

To prepare a preference statement, soldiers should get help from their military personnel office, personnel staff noncommissioned officer (NCO), or the NCO at their battalion personnel administration center. Questions the soldier should ask are:

- When should I submit my preference statement?
- Are my military occupational specialty (MOS) and grade authorized at the locations of my choice?
- Are dependent schools available?
- Is there a military hospital nearby?
- What type of assignment should I ask for to get the most experience in my MOS?
- If my spouse is a Federal employee, are there employment opportunities at the desired locations?
- What programs and locations are available for exceptional family members?

Others to consult with to answer these questions are commanders, command sergeant major, Army Community Service or the family physician. AR 614-200 and Department of the Army (DA) Pamphlet 600-8 contain detailed procedures for completing and submitting DA Form 2635.

OPMS Revised

(Adapted from U.S. Army MILPERCEN PAO material.)

The results of the year-long review of the Army's Officer Personnel Management System were distributed to the officer corps last October. Eight key changes are to be made during the next 5 years. The eight changes being made are:

- A one-time, comprehensive, Armywide review of all authorization documents and the establishment of centralized approval of changes to control the Army Authorized Document System at Headquarters, Department of the Army level.
- Establishment of immaterial positions.
- Revision of the Commissioned Officer Classification System.
- Allow officers to have multiple career patterns (single, dual and sequential tracks).
- Branch transfer of some officers from combat arms branches to combat support and combat service support branches to meet Army requirements at the officers' third and eighth year of service.
- One branch per officer.
- Career development and promotion by branch and/or functional area.
- Modification of command selection procedures to emphasize selection of serving lieutenant colonels and colonels.

Several actions have been taken to implement these changes. Branch proponents and major Army commands are reviewing tables of distribution and allowances and tables of organization and equipment with regard to the revised officer classification system. Recommended changes for these documents should be ready shortly. All documentation should take effect during fiscal year 1987. Four immaterial position codes are being incorporated in the documents:

- *Branch immaterial* (01A). This code will be used to identify positions that can be filled by any officer. If there is no requirement for the officer to have a specific branch, and he or she will not perform the duties of an officer of a particular branch as outlined in AR 611-101, the position will be coded branch immaterial.
- *Combat arms immaterial* (02A). This code will be used to identify positions that can be filled by any combat arms officer (AV, IN, FA, AD, EN, AR). If there is a requirement for an officer to have experience in one of the combat arms branches, but not in a specific branch, the position will be coded combat arms immaterial.
- *Logistics immaterial* (03A). This code will be used to identify positions that can be filled by any logistics officer (OD, QM, TC). If there is a requirement for an officer to have experience in one of the logistics branches, but not in a specific branch, the position will be coded logistics immaterial.
- *Personnel immaterial* (04A). This code will be used to identify positions that can be filled by an AG officer (branch code 42) or any officer holding 41 (personnel management).

Changing the commissioned officer classification system means that AR 611-101, "Commissioned Officer Specialty Classification System," must be revised. The Soldier Support Center-National Capital Region is receiving revisions from branch and functional area proponents and staffing them. Military Personnel Center (MILPERCEN) will use the revised officer classification codes beginning in fiscal year 1987. *Commanders Call,* September to October 1984, gives a complete description of the commissioned officer classification system.

Officers will be allowed to have multiple career patterns—single, dual and sequential. This means that dual tracking for all officers is no longer required. Most officers will continue to dual track under the current system in order to meet Army requirements. However, many combat support and combat service support officers may single track in their branches, and some officers from all branches may sequentially track in a functional area and concentrate their efforts there at various points in their careers. In the future, there will be no officers with dual branches (for example, 15/92—Aviation and Quartermaster). During the transition period, "grandfathering" provisions will exist. For officers who currently have dual branches, a variety of career patterns will be available in the future.

The revised command selection procedures have all been implemented. They are:

- Each command board is now using three panels.
- Ten percent (or less) of command positions were assigned to majors (P) and lieutenant colonels (P) by the fiscal year 1986 command boards which adjourned last fall and winter.
- No majors (P) or lieutenant colonels (P) are on either alternate command list.
- The practice of "frocking" commanders is being reduced by slating promotable officers to assume command late in the fiscal year whenever possible.
- Basic training battalions and brigades are being slated for Infantry officers only, instead of following the past practice of slating any combat arms officers into the commands.

The philosophy of the officer corps as formulated by the study group is being provided to selection boards in their advance packets, and will be used to instruct officers at basic and advanced courses.

Many of the approved recommendations will be implemented over a period of several years. Periodic updates in this publication will provide reports on transition policies, grandfathering and projected timetables.

UH-1 Iroquois
(Huey)

UH-60 Black Hawk

OH-6 Cayuse

OH-58D Kiowa

AH-1S Cobra

AH-64 Apache

UNITED STATES
ARMY
INVENTORY
OF
AIRCRAFT

illustrations by
Doug Harrison

CH-47 Chinook

CH-54 Ta

U-8F Seminole

U-21 Ute

OV-1 Mohawk

TH-55 Osage

T-42 Cochise

Tarhe (Crane)

C-12 Huron

AVIATION LOGISTICS

New FMs To Set ALSE Doctrine

Mr. Carl Humerickhouse
U.S. Army Aviation Logistics School
Fort Eustis, VA

NOT SO LONG ago, Aviation life support equipment (ALSE) in the Army meant a badly fitting flight helmet and flight suit, leather gloves and a survival radio of doubtful reliability. Often these items had to be "scrounged" from another service—the Air Force, Navy or Marine Corps.

Even worse, maintenance for this equipment was strictly of the do-it-yourself variety. Ingenuity was stretched to the point where scenarios such as "I know the ALSE group over at Luxury Air Force Base, and I'm sure they'll help us in exchange for a ride in a Cobra" were often the only way to get ALSE maintenance done.

Fortunately for all of us in Army Aviation this scene is changing—fast. ALSE is now recognized as a vital component in Army Aviation weapons systems and is getting the attention and resources commensurate with the important role it will have in the air-land battle of the future. Army aircrewmembers must and will be able to rely on carefully engineered, dependable ALSE that enhances their ability to accomplish the mission while ensuring their survivability in the air-land battle's hostile environment.

Today's Army aviator is equipped with a whole new generation of ALSE that is continually being improved—like flight helmets, flotation equipment, survival vests/kits and protective flight clothing. When they draw their flight equipment, Army aviators will no longer feel like last-in-line stepchildren and "orphans of the storm."

Because ALSE is vital to success on the air-land battlefield and because its improved quality and greater complexity make it a more costly investment, ALSE maintenance and management have been given more attention than ever before. This close scrutiny highlighted the need to

establish a strong ALSE maintenance program.

Accordingly, a program of instruction to train ALSE maintenance technicians was launched at the U.S. Army Aviation Logistics School (USAALS), Ft. Eustis, VA, in January 1982. Since the program's inception, USAALS has graduated 493 officers and enlisted men who are qualified to establish and operate ALSE maintenance programs at the unit level. (***Aviation Digest*** for November 1984, page 32, gives specific information on course dates for the program.)

As the program matured and graduating students returned to their units, both they and their instructors at USAALS began to get a clearer mental picture of some of the problems involved in implementing ALSE maintenance in the unit. One challenge that was identified as requiring "major surgery" was the need to create ALSE doctrine and reference materials geared specifically for use in Army Aviation.

At present, the ALSE technician still has to plough through a big stack of maintenance and supply manuals and references —most of them published by the other Armed Forces and intended for their objectives and target audiences—to find the information he or she needs. To reduce all this data to more manageable, handy-to-use dimensions and to standardize it for Army use, the ALSE subject matter experts at Ft. Eustis are now developing a series of six field manuals:

FM • FM 1-508-1, ***"Maintaining Aviation Life Support Equipment (ALSE) (Maintenance Program)."*** Addresses the establishment of a standard ALSE maintenance program for the U.S. Army. It will support the establishment of a new military operational specialty for ALSE specialists and provide commanders at all levels a basis to justify the establishment of an ALSE maintenance shop. The manual will be published during the third quarter of FY 85.

FM • FM 1-508-2, ***"Maintaining Aviation Life Support Equipment (ALSE) (Personal Equipment)."*** Covers the maintenance of protective flight clothing, such as flight suits, gloves, winter flight clothing, jackets, hoods, underwear, boots, body armor, restraining harnesses, quick-don and constant-wear antiexposure suits, helmets and night vision goggles. It will be published during the second quarter of FY 86.

FM • FM 1-508-3, ***"Maintaining Aviation Life Support Equipment (ALSE) (Flotation Equipment)."**** Will cover procedures for the care, repair, maintenance, inspection and storage of life preservers, one-man and multiplace rafts and how to recharge carbon dioxide cylinders.

FM • FM 1-508-4, ***"Maintaining Aviation Life Support Equipment (ALSE) (Survival Equipment)."**** Will cover all maintenance, care, repair, inspection and storage of all survival vests, individual kits and multiperson survival kits.

FM • FM 1-508-5, ***"Maintaining Aviation Life Support Equipment (ALSE) (Medical Equipment)."**** Will cover all maintenance, care, inspection, storage and issue of all first-aid kits used (aircraft, vest and flotation kits).

FM • FM 1-508-6, ***"Maintaining Aviation Life Support Equipment (ALSE) (Oxygen Systems and Related Equipment)."**** Will cover all maintenance, care, testing and inspection of oxygen masks, test equipment, and the recharging of oxygen cylinders.

****These manuals will be published in the fourth quarter of FY 86.***

Change 4, Army Regulation 95-1

Mr. Pat Wall
Directorate of Evaluation and Standardization
U.S. Army Aviation Center
Fort Rucker, AL

CHANGE 4, Army Regulation (AR) 95-1, is based on recommendations from Army users, Department of Defense (DOD) directives and results of the 1984 Army Aviation Policy Committee meeting. Drafts of the change, with rationale, were reviewed by Policy Committee members listed in chapter 3, AR 95-1, earlier this year. The final product was developed from committee members' comments.

Since portions of this change have a significant impact on what happens in Army Aviation during the next 12 months, the following summary is provided to highlight key elements and explain the reasons for them.

• *Paragraphs 1-9 and 2-22.* These changes are made as a result of a decision made at the 1984 Army Aviation Policy Committee meeting to prohibit nonrated persons from starting, running-up or taxiing helicopters.

• *Paragraph 1-17a(1).* This change became necessary as a result of high-intensity strobe anticollision lights that have been installed on Army aircraft and the potential hazard caused by the blinding flashes.

• *Paragraph 1-17b.* Night vision goggles (NVG) training and the exceptions to Federal Aviation Regulation, Part 91, granted by the Federal Aviation Administration are the reasons for this change. It also provides for aircraft lighting for NVG flight outside continental United States after appropriate coordination with the host country.

• *Paragraphs 2-1c, d; 2-3a(1), (2), (3) and (4); and 2-3b(4) and (5).* These changes are the result of a Headquarters, Department of the Army (DAMO-FDZ) directive to incorporate into AR 95-1 provisions of the Deputy Secretary of Defense memorandum, dated 19 June 1984, subject: Use of DOD Aircraft and Related Travel Policies. Special emphasis is placed on cost effectiveness when considering travel in U.S. Army aircraft.

• *Paragraph 2-12 and Table 2-3.* Crew Endurance. This paragraph and the table relate more to "crew endurance" than to "crew rest," thus, the reason for the change.

• *Paragraph 2-15a.* Prebreathing of oxygen in unpressurized aircraft with onboard generating equipment has been added to this paragraph.

• *Paragraph 3-6 and 3-32.* These changes are made to agree with the aircrew training manual Commander's Guide, specifying that the annual aviator

proficiency and readiness test is applicable only to aviators in aviator readiness level one status.

• *Paragraph 3-21.* This paragraph incorporates Army Vice Chief of Staff guidance from CSA WASH DC (DACS-ZB) message 151325Z March 1984, subject: Aviation Safety FY 84. The symbology and definitions of other flight crewmember duties will be changed to support a new flight records system scheduled for introduction in FY 86.

• *Paragraph 3-24.* Under the provisions of this paragraph, unit trainers will be authorized to validate successful completion of required training; i.e., border and corridor qualification, local area orientation, etc.

• *Paragraph 4-2c.* The word "current" is deleted from the first line of the paragraph, because more than current weather is required for planning. Past, current and forecast weather are all important in the planning process.

• *Paragraph 4-2c(4).* The wording of this paragraph is changed to clarify the intent of how special visual flight rules (VFR) may and may not be used. Special VFR departure from any control zone is authorized. However, filing to a control zone outside the local flying area for special VFR entry is not authorized. There is no document readily available to Army aviators that provides special VFR information. Furthermore, there is no assurance that authorization will be granted to enter a control zone under special VFR upon arrival.

• *Paragraph 4-2c(6).* Area forecasts are authorized to be used for weather planning to destination and alternate airports under provisions of this paragraph.

• *Paragraph 4-2c(7).* This paragraph authorizes use of civil or military weather information for flight planning. Application of void time has been clarified.

• *Paragraph 4-2e(1) (f).* This paragraph is added to specify that instrument flight rules (IFR) flight is not required if a copilot is not in the aircraft.

• *Paragraph 4-2h.* Reference to Table 4-3 for equipment and training necessary for Category II instrument landing system approaches has been added. As newer technology becomes available and appropriate equipment is installed in Army aircraft, provisions are made to permit Army aviators to use the lower minima.

• *Paragraph 4-3.* These changes now specify that takeoff minimums apply to the aviator making the takeoff. An attempt has been made to clarify the use of nonstandard departure procedures. Other changes apply to paragraph renumbering.

• *Paragraph 4-4e.* This paragraph is added to indicate that Table 4-1 applies to en route as well as preflight planning.

• *Paragraph 4-5b(5).* A great deal of confusion has been expressed about beginning an approach for straight-in landing, regardless of ceiling and visibility (especially how approach course/runway alignment and circling minimums apply). Considering that descent cannot be made below decision height or minimum descent altitude without complying with paragraph 4-5d, regardless of the type approach, safety is not sacrificed under any circumstances. This change permits an approach to be commenced regardless of ceiling and visibility.

• *Table 4-1.* NOTE "e" is changed to indicate that vertical helicopter IFR recovery procedure (VHIRP) activation is mandatory if flights are to be conducted in weather conditions below those specified in the table. NOTE "g" is added to ensure that weather is adequate for VHIRP recovery procedures.

• *Table 4-2.* NOTE 5 is added to magnetic compass to eliminate the confusion regarding use of either remote indicating or standby compass for day and night visual meteorological conditions flight. NOTE 6 is added to indicate that the low-fuel caution light is not a part of the fuel quantity indicating system.

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362-5000; or call us at AUTOVON 558-3504, FTS 533-3504 or commercial 205-255-3504. After duty hours call Ft. Rucker Hotline, AUTOVON 558-6487 or 205-255-6487 and leave a message.

MONTHLY WRITING AWARD

Dehydration, Heat Illness and Army Aviation

Major Glenn W. Mitchell, M.D. and **Captain Robert W. Wein, M.D.**
U.S. Army Aeromedical Research Laboratory
Fort Rucker, AL

HEAT ILLNESS can be avoided simply by reducing exercise levels in the sun when the temperature is too high, right? And extra swallows from your canteen are necessary to compensate for sweat losses. Good advice for ground troops, but what about the special case of the aviator and aircrew? The situation inside an aircraft is very different than that on the ground.

The average aircraft cockpit is like a greenhouse. Sunlight comes in and heats up the seats, equipment, aviators, everything inside. This heat is trapped and builds up during the day if measures are not taken to reduce it.

There are several additional factors affecting the heat which are transferred to you. Radiated heat is very high from blacktop parking and runway areas. Heat is conducted directly to you from your seat, especially if it has been in the direct sun. This effect is multiplied further if armor is in place due to the metal's capacity to retain large amounts of heat (like a cast iron frying pan!). Heavier uniforms and more layers of clothing (such as MOPP gear) retain heat and retard sweat evaporation. Dark colored clothing also absorbs heat from sunlight more efficiently.

This heat from outside of you is added to the heat made by your own body as you use your muscles and digest your food. Luckily, although flying is mentally demanding, not too much heat is generated inside your muscles during average flight profiles. Significantly, however, large amounts of internal heat are generated by the muscular effort involved in preflighting and in aircrew activity in a forward arming and refueling point. Thus, the real problem for your body is to get rid of the heat which it has built up both by its own metabolism and by the extra heat received from outside sources.

The best way to get rid of body heat is sweating. This provides a layer of fluid on your skin which will lose a large amount of heat when it evaporates. Remember, dripping sweat is not cooling you! Only the sweat which evaporates on your skin is effective. That is why you feel cooling when air blows on you.

Of course, the air has to be able to absorb extra water vapor in order to evaporate your sweat. This is the reason that relative humidity affects cooling—the higher the relative humidity, the less evaporation and cooling you will feel. Another way that the air's capacity to absorb moisture and heat is noticed is that moving air increases the cooling rate by providing more air to carry the water and heat away from you. This extra capacity is critical in high heat situations.

When you sweat, your body loses fluid. If this fluid loss is not replaced, then *dehydration* occurs.

Dehydration, simply stated, is the medical condition that results from loss of body water. The explanation can be a lot more complicated, but for our purposes we're concerned with the type that occurs in an opera-

tional environment. To the average healthy Aviation crewmember, this means failure to replace water losses from sweating.

Suppose you are sent to a hot tropical environment with daily temperatures of 100 degrees Fahrenheit. How does your body react?

Studies have shown that at such temperatures virtually all heat produced by the body must be eliminated by evaporation of sweat. When working hard the nonacclimated individual could produce close to 1 liter (about a quart) of sweat every hour. After acclimation occurs, the sweat glands become conditioned to produce even more sweat to help you to cool off.

But before acclimation occurs, the soldier can easily get a 1 percent dehydration for every hour he or she fails to replace fluids. If you have less than about 2 percent dehydration, there is relatively little problem. Above 2 percent, though, things begin to deteriorate. The sensation of thirst develops at this point along with dry mouth; one is easily fatigued; suffers dizziness (perhaps even fainting) upon standing; and other less recognizable symptoms such as decreased urine output. These signs progress as the degree of dehydration advances.

Body dehydration of 6 percent (which amounts to about a 4-liter or 1-gallon deficit in the average male) has been shown to lead to a noneffective soldier. This can happen in less than 6 hours!

Why are all of these numbers important? Because *any* degree of dehydration makes it easier for a soldier to become a heat casualty, and it also leads to a dramatic degradation of work performance.

How does all of this relate to the real world of Army aircraft? How big a problem is dehydration to us?

A study performed in 1966 on OV-1 Mohawk aviators in Vietnam found they produced a pound of sweat per hour while flying. These levels of fluid loss were contributing to heat casualties experienced by that unit. The problems were alleviated when the fluid intake was increased.

With the advent of the latest generation of highly maneuverable helicopters (UH-60 Black Hawk and AH-64 Apache), there will be more Aviation crewmembers pulling G (gravity) forces. How does dehydration affect tolerance of Gs? The Air Force looked at A-10 pilots who were conducting hot weather desert flights. They averaged 2.3 percent dehydration, had decreased G-tolerance and increased general fatigue.

But you're saying, "I'll drink plenty of water and avoid all those problems." Another study pointed out that a soldier will voluntarily get a 5-percent dehydration if water supplies are warm or pretreated for purity, especially under the stress of field operations. This means that you may not drink enough to keep yourself healthy even if sufficient supplies of safe water are available.

What can you do to correct heat illnesses?

Not all aircraft have air-conditioned cockpits, and even those that do, have operational restrictions on use of the system and are known to have equipment failures. You can keep the aircraft opened up whenever possible to provide airflow, and you can avoid courses steering into the sun. You can eat the right foods (the meals ready to eat are just right) to provide the extra salt necessary to compensate for that loss in sweat. You can avoid long pauses on the blacktop and even try covering your armored seat with a reflective survival blanket when your aircraft is parked in the sun.

If extra uniforms are going to be used, try to acclimate to them in advance. One week of wearing the uniform for 2 hours a day will provide increased protection from the heat buildup. Remember, too, that the ground's radiant heat as well as the heated air has a short vertical extent. Your heat load will be decreased dramatically once you are out of ground effect. Climbing to higher altitudes also will reduce the ambient air temperature.

But the most important way to prevent heat illness is to prevent dehydration. How?

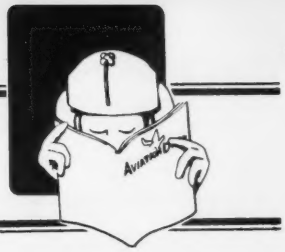
First, command elements must ensure delivery of appropriate amounts of water. Second, the soldier must drink it—enough of it and frequently enough. In military tests where commanders enforced fluid intake, the heat casualty figures dropped dramatically.

The most effective way for individual soldiers to ensure that they do not get dehydrated is to plan for those times when they are not going to be near a water supply and to take as much water with them as they can. Probably the best way to replace your fluids is to drink small amounts every 20 or 30 minutes instead of larger amounts less frequently. In any event, take the amounts recommended by your commander or medical officer regardless of the water's temperature or palatability.

Even with use of the countermeasures discussed above, environmental illness can occur. You must be alert to the early effects of heat illness because symptoms build rapidly once the condition starts, if the heat load is not reduced. The nausea, headache, giddiness and/or dizziness you feel, or your crew complains about, may well be the onset of heat illness. The input of heat must be reduced and the loss must be enhanced quickly if mission effectiveness is to be maintained. Drinking extra fluids, removing some clothing layers, increasing airflow increasing altitude and getting out of direct sun will help. air moving over the head is especially effective, and lifting the helmet slightly into the cockpit airflow for several minutes may help.

If the symptoms worsen, however, *do not* ignore them. Medical attention and treatment is necessary to avoid incapacitating or even fatal complications.

VIEWS FROM READERS



Editor:

I really liked the articles on NBC. I am presently an NBC specialist in the Marine Corps and I am always eager to read and learn more about the NBC field.

I would greatly appreciate it if you could send me the following *Aviation Digest* articles:

"Nuclear, Biological, Chemical Training and Development," August 1981; "Nuclear, Biological, Chemical Decontamination Problems," October 1981 and "Chemical Agents, First Aid and Long Term Effects," December 1981.

CPL Ron Barone
Hams-12, Mag-12, S-3, NBC
1st MAW
FPO San Francisco

Editor:

Aviation accidents are increasing. Reams of DA messages and additional paper won't reduce them. The Army Aviation accident rate is climbing and as it does, the pre-mission planning and briefing requirements also continue to climb. When I approach the helicopter to fly these days two thoughts cross my mind. First, I hope the wind doesn't blow all that paper around, causing an FOD problem. Second, I feel sorry for the trees we are killing producing all that paper.

I fly the aircraft the same way I did in 1969; by applying simple good sense and basic flying skills. Unfortunately, good sense cannot be legislated by DA messages. Basic flying skills can be improved by DA allowing the Aviation Center to spend more time and money in primary Aviation training. Today, we teach everything at Ft. Rucker except how to fly. When the solo and dual cross-country flights were deleted from primary training, we seriously deprived our fledgling aviators of the opportunity to learn and apply basic skills and to build the confidence that they will need to survive everyday flying, not to mention battlefield conditions. The old 210-hour program was better than the one that exists today.

The student washout rate must be brought back to reality in all phases of initial training. This can be accomplished by allowing the branch commanders and decisionmakers at Ft. Rucker to listen to the instructor pilot's recommendations that are well documented on the daily grade slips. Initially, it is difficult to tell a student he or she is eliminated, but after a dozen or so students it is really very easy.

Army Aviation enjoyed a relatively low accident rate during the years immediately following the Vietnam War. During the war, aviators who actually had accidents were placed under the "combat loss" column. The pilots performing as PIC and IP during the post-war years had undergone a screening process. Simply put, the aviators who do foolish things during wartime become combat losses. Pilots who do foolish things in peacetime become accidents.

Let's get busy back at Ft. Rucker and apply good sense; improve basic flying skills and give the trees a break.

CPT Gary S. Fowler
APO Miami

Articles from the Aviation Digest requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, U.S. Army Aviation Digest, P.O. Box 699, Ft. Rucker, AL 36362-5000.

U.S. Army Class A Aviation Flight Mishaps

	Number	Flying Hours (estimated)	Rate	Fatalities	Total Cost (in millions)
FY 84 (to 12 July)	32	1,182,287	2.71	30	$49.2
FY 85 (to 12 July)	38	1,195,002	3.18	27	$65.6

ANNUAL WRITING AWARDS

January
Back Pain in the Army Helicopter Pilot
MAJ Dennis F. Shanahan, M.D.

February
Pilots I Have Known
CW4 Michael J. Novosel

March
Flying Navy Style
MAJ Lew Jennings

April
Kill or be Killed—Part II: The Apache
CW4 William Yarlett

May
Threat: Spetsnaz, The Hidden Enemy
CPT Al Holder

June
I Am the Aviator—Above the Best
CPT Walter R. Cook

July
Emergency at 36,000 Feet
LTC Brendan P. Blackwell

August
Threat: Big Sky—Little Helicopters?
MAJ Dale L. Radtke

September
Dustoff Does It Better
CPT Thomas Bailey

October
Threat: Threat Air Defense
CW2 Charles E. Butler

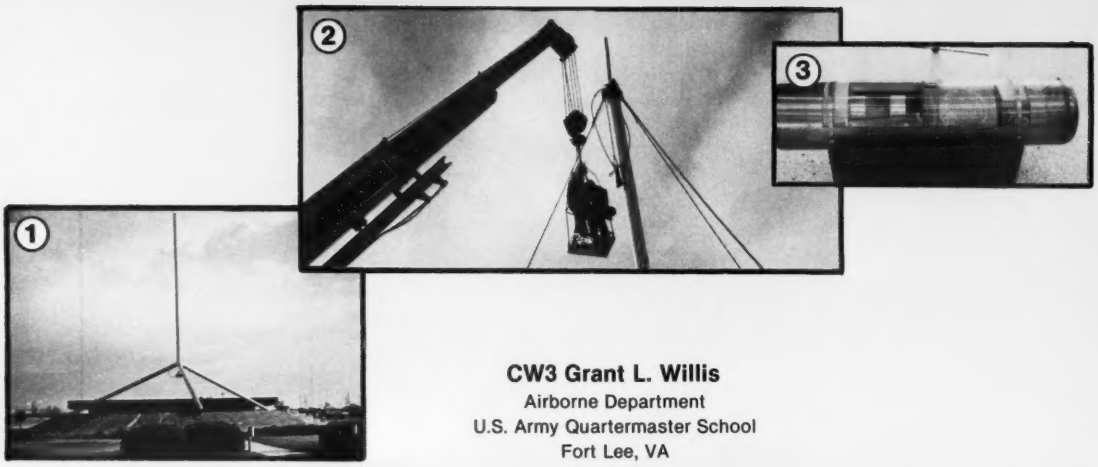
November
Threat: Soviet Helicopter Armament
Mr. Edward J. Bavaro

December
"All Blood Runs Red"
MAJ Phillip E. Raschke

1st Mr. Edward J. Bavaro

2d MAJ Dale L. Radtke

3d CPT Al Holder



CW3 Grant L. Willis
Airborne Department
U.S. Army Quartermaster School
Fort Lee, VA

What Does It Take To Move A Monument?

THE PURPOSE OF the Armed Forces of the United States is to defend the Nation against the risks of future wars. Aside from disasters and the like, it is not uncommon for the Armed Forces to support the community in many ways. The city of Amarillo, TX, requested the assistance of the Army to move a monument by helicopter a distance of 15 miles. The Army accepted the mission of relocating the $3,000,000 stainless-steel structure. Meetings were held with city officials and engineers; the route was chosen, and rigging techniques and methods were employed.

The monument was constructed in 1968 to endure as a visible reminder to future generations of the concern in our time for effective natural resource utilization. Encased inside the monument are vacuum sealed capsules containing various artifacts of our time to be opened by future generations. The helium monument is unique. It weighs about 17,000 pounds, with a height of 41 feet. Due to the design and dimensions of the monument, it could not have been moved (intact) any way other than by air.

On a perfect winter morning, the Army CH-47 Chinook helicopter lifted the 8½-ton tripod (topped by a 28-foot spire); and 21 minutes later, the Chinook gently deposited the monument adjacent to the Discovery Center.

Although technology proved itself quite sound in the rigging of the structure, one imagines all sorts of things that could go wrong (causing a sleepless night or two). Triumphant tears of joy surfaced once the structure sat down at the new site. End result: Mission was highly successful—not even a scratch on the beautiful monument—without any property damage or injury to anyone.

Photographs clockwise from above:
1) Helium monument as it stood at the old site. 2) Riggers about to prepare the multiple suspension hook-up point. 3) Time capsules housed inside the tripod legs of the monument to be opened by future generations. 4) Cap being prepared for use to connect the support cables that extend from the top to each tripod leg of the structure. Carpet scraps were used to wrap all areas of the monument exposed to abrasion in the rigging of the structure. The 5-inch diameter plastic tubing (which would have served as a buffer had the helicopter dropped down while over the structure during hook-up) was mounted on the cap to support the "donut" (lifting device). 5) All chokers, cables, shackles, turnbuckles, swivels and other fittings were inspected and rated for a load at least two times the force actually required. 6) Breathtaking moment (following the hook-up) as the helicopter obtained height prior to forward movement. Helium molecules (under the tripod) were enclosed with a nylon net to prevent them from falling. 7) Helium monument en route to its new home at an altitude of 500 feet above ground level. 8) The helium monument as it stands today, illuminated at night in front of the Discovery Center at Amarillo, TX.

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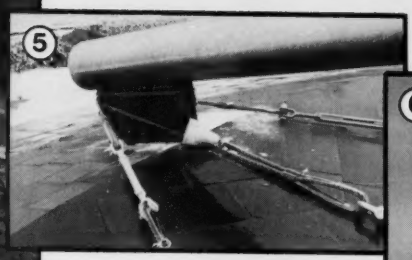
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J-FIRE

Lieutenant Colonel Dick Bartels, USAF
TAC-TRADOC Air-Land Forces Application Agency
Langley Air Force Base, VA

This article is the fifth in a series about projects being developed by the Air-Land Forces Application Agency (ALFA). Created in 1975, ALFA's mission is to manage activities of the (Air Force) Tactical Air Command—(Army) Training and Doctrine Command team efforts toward development of improved doctrine associated with future air-land battle operations. The first article of the series, "ALFA Agency," appeared in the March issue. It was followed by "Joint Attack of the Second Echelon" in April, "Joint Tactical Deception" in May, and "Joint-Rear Battle" in June. Copies of these articles can be obtained by writing to Editor, *Aviation Digest*, P.O. Box 699, Ft. Rucker, AL 36362-5000, or by calling AUTOVON 558-6680.

IN JANUARY 1984, as a result of Operation Urgent Fury lessons learned, the Joint Actions Steering Committee (JASC) tasked Air-Land Forces Application Agency (ALFA) to examine the need for a single source joint fire support handbook incorporating current service doctrine and procedures. ALFA convened a four service joint working group, which confirmed the need for such a document. In March 1984, the JASC approved the Joint Application of Firepower (J-Fire) program order requiring ALFA, with four service participation, to develop, publish and disseminate a quick reference guide on J-Fire. Since that time, ALFA has hosted four joint working groups to develop and refine a draft handbook for JASC approval, publication and ultimate worldwide distribution.

The overall purpose of the J-Fire program is to produce a single source joint fire support quick reference guide for field use, as identified by Urgent Fury reports. Forces participating in Urgent Fury had problems in the areas of close air support, naval gunfire support and joint training. A single source document for field use during training and contingencies, such as J-Fire, could have solved these problems. Since there is no single source document to address these problems, J-Fire can be implemented quickly

because it uses existing service doctrine and procedures.

A related problem is that none of the services has its own standardized close air support briefing —and there assuredly is no common one for all services. Tactical Air Command and Marine Corps Development and Education Command have agreed on a common briefing that will be published in service documents. They will submit a change to JCS Pub 12 incorporating the agreed upon format.

Throughout ALFA's four working meetings, all the action officers from the four services emphasized that this document should be designed for use by tactical forces in the field, not for staff planning or for a teaching guide for schools. Additionally, J-Fire's purpose was not to revise doctrine or procedures, but to consolidate existing procedure into a format easily used in the field. It is to be pocketsized and weatherproof, and its users can write on it with grease pencil. It will be a "user-oriented" document for tactical air control parties, forward air controllers, air and naval gunfire liaison company fire support teams and company commanders. It will also be used by platoon and squad leaders and forward observers.

Light divisions particularly will benefit from its use as they will be deployed early in a contingency—a time when the need for J-Fire will be greatest. Additionally, Reserve Component forces can use the J-Fire guide as an important training aid since they train less frequently than the Active forces, although their wartime missions are equally as important.

The J-Fire quick reference guide is currently out for command signature at Tactical Air Command, Training and Doctrine Command, Readiness Command, Atlantic Fleet, and Marine Corps Development and Education Command. Anticipated publication and distribution is July 1985.

ARMY AVIATION RESEARCH LAB CHANGES NAME

HEADQUARTERS, U.S. Army Research and Technology Laboratories—AVSCOM, NASA Ames Research Center, Moffett Field, CA, has changed its name to U.S. Army Aviation Research and Technology Activity (ARTA), effective immediately, it was announced by Dr. Richard M. Carlson, director of the research organization.

Four subordinate research units of the activity have also undergone a name change. They are: The Aeroflightdynamics Directorate, formerly the Aeromechanics Laboratory, also located at NASA Ames; the Propulsion Directorate, formerly the Propulsion Laboratory, NASA Lewis Research Center, Cleveland, OH; the Aerostructures Directorate, formerly the Structures Laboratory, NASA Langley Research Center, Hampton, VA; and the Aviation Applied Technology Directorate, formerly the Applied Technology Laboratory, Ft. Eustis, VA.

The U.S. Army Aviation Research and Technology Activity conducts Army Aviation research for the Army Aviation Systems Command, St. Louis, MO. The name changes are the result of AVSCOM's parent unit, the Army Materiel Command, which moved from laboratories to a research, development and engineering center in each commodity command; the change has no impact on the ARTA mission or functions.

ERADCOM

Providing the Critical Combat Edge

Captain Greg Kaufmann
ERADCOM Flight Test Activity
Naval Air Engineering Center, NJ

One of the lab's most recent projects has been the development of the HGU-56/P Aircrew Integrated Helmet System shown here with ANVIS night vision goggles and chemical defense equipment.

This is the third article in a series dealing with the various laboratories and activities of the Electronics Research and Development Command (ERADCOM). Two previous articles (April and May) deal with the Atmospheric Sciences Laboratory (ASL) and ERADCOM Flight Test Activity (EFTA). The entire organizational structure of ERADCOM was diagramed in the April issue.

On 25 April 1985, the Department of the Army announced a major reorganization aimed at improving the effectiveness of the U.S. Army Materiel Command research and development effort. The actions are designed to enhance the quality, productivity and effectiveness of the laboratory system to improve support for the Army's readiness and force modernization program. This is an organizational change and does not result in any relocations.

ERADCOM is to be converted to form the nucleus of a new command—The U.S. Army Laboratory Command. ASL, EFTA, the Night Vision and Electro-Optics Laboratory, and the EFTA Flight Test Detachment, discussed in this article, are to fall under the Communications-Electronics Command at Ft. Monmouth, NJ. A future article will discuss the reorganization in detail and specify what the new alignment will look like.

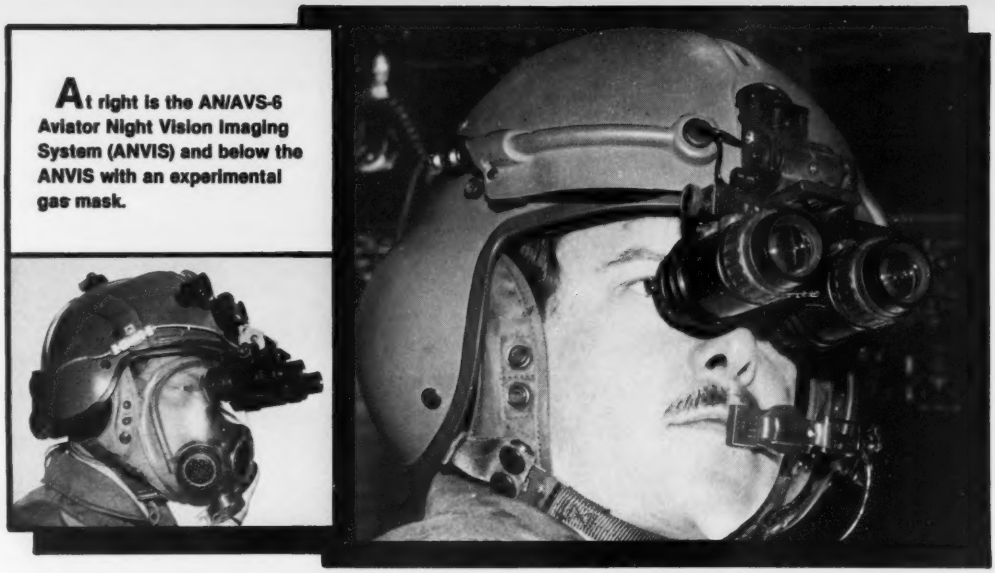
Night Vision and Electro-Optics Laboratory and the Flight Test Detachment— Joining Forces in the Conquest of Darkness

ONE OF THE major areas of change over the past 10 years in Army Aviation has been its move toward effective, force multiplying, around-the-clock operations. This has naturally seen the development and introduction of vision devices which use different technologies to achieve night and low visibility capabilities. These various technologies were not greeted warmly with unbounded enthusiasm, however.

The trepidation with which the original PVS-5 night vision goggles (NVG) and their fielding were greeted by line pilots is easily recalled. In fact, chances were that the PFC or SP4 who had guard duty during a field training exercise or an Army Training and Evaluation Program became more familiar with the NVG than the aviators did!

It is apparent that night vision goggles have received wholesale acceptance after product refinements and an indepth training program which begins at the initial entry training level. But, one of the most repeated questions heard in the beginning was, "Who developed and tested these things?" Credit goes to the Night Vision and Electro-Optics Laboratory (NVEOL), one of seven Electronics Research and Development Command (ERADCOM) laboratories, and its direct support Aviation element, ERADCOM Flight Test Activity (EFTA) flight test detachment (FTD).

NVEOL and FTD trace their common lineage back to the mid-1960s when it became necessary to develop technology to counter the night operations of the Vietcong [see the history of the unit on pages 42 and 43]. Today, NVEOL continues to pursue research, development, test and evaluation (RDTE) in emerging technologies which form the basis for advanced night vision and target acquisition systems. While this work by NVEOL is applicable to the entire Army community, this article takes a close look at the Army Aviation applications of its work. To support its efforts in this area, the FTD is provided to the NVEOL in a direct support role to afford the Aviation expertise needed during proof of concept, research and developmental flight testing.



At right is the AN/AVS-6 Aviator Night Vision Imaging System (ANVIS) and below the ANVIS with an experimental gas mask.

Night Vision and Electro-Optics Laboratory (NVEOL)

The people at NVEOL feel that the name of the laboratory aptly describes both the NVEOL mission objective of night vision and the technology area of emphasis which is electro-optics. Night vision refers to improving sight under poor visibility conditions such as darkness or battlefield atmospheric clutter. Electro-optics involves the use of low-energy lasers for range finding, target designation and weapon aiming.

By pursuing its mission with determination and dedication, NVEOL now finds itself as a recognized world leader in infrared (IR) imaging, image intensification, low-energy lasers and high intensity illumination technologies. Some of the more significant developments for Aviation applications have been the various night vision goggles, the electro-optic sights used for guiding TOW antiarmor missiles, and the target acquisition designation sight/pilot's night vision sensor (TADS/PNVS) developed for the AH-64 Apache.

To fully understand the equipment, an appreciation of the technology used is necessary. Early versions of night vision devices were near infrared systems. The drawback was that they were active—that is they emitted radiation and then measured its reflection from the objects being viewed. This meant that they were easily detected. This shortcoming provided the impetus needed to develop a passive system that could not be detected.

Image intensification (I^2) was the result. The PVS-5 was the first device using this passive system. The AN/AVS-6 Aviator Night Vision Imaging System (ANVIS) now being delivered to the field represents the state-of-the-art in third generation, night vision, image intensification technology. (The PVS-5 originally was developed for ground use, and then modified for Aviation applications. ANVIS is the first night vision device designed for aviators from concept to production.)

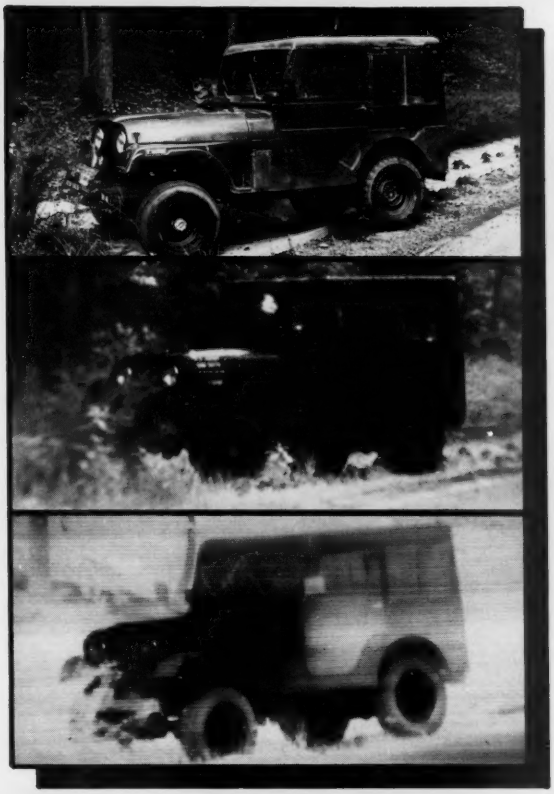
These passive systems operate by intensifying available ambient light through a complicated system which is beyond the scope of this article to explain in simple terms. The greatly improved performance of the third generation I^2 devices is due to the increased sensitivity to near IR of these

devices. The second generation I² devices were not very sensitive to near IR, and therefore were limited by available ambient light. This difference in the I² devices is important because starlight has a high amount of IR, which allows ANVIS to be operated at much lower ambient light levels than the PVS-5.

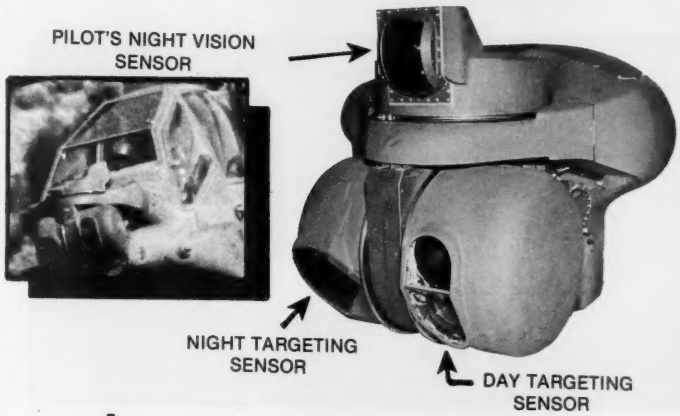
I² devices are operable in very low light levels (overcast starlight), haze, smoke and even light fog. However, no matter how sophisticated the I² devices become, they still need moonlight or starlight to operate. This inherent restriction launched research in the middle 1960s for the development of thermal imaging equipment.

The thermal imaging system takes thermal energy emitted from a scene and converts it into a visible image that is displayed to an observer. This system is commonly referred to as forward looking infrared, or FLIR. An infrared detector, the heart of the system, is a material which emits electrical energy proportional to the amount of infrared energy absorbed. These electrical signals are then amplified and used to generate a visible picture.

The TADS/PNVS used on the AH-64 is based on this technology. The capabilities provided by these systems should be well known to the readers of the *Aviation Digest* by now. Also, older aircraft in the fleet are benefiting from this technology. About half of the AH-1 Cobra fleet will be modified to accept a night vision system designated C-NITE (Cobra-Nite). This will provide FLIR capability and will enable the Cobra to fire and guide the new TOW-2 missile. This system also will be able to see through haze and smoke, and the device will be installed in the telescopic sight of the airborne TOW missile system. Both the M-65 standard optical sight, and the M-65L laser augmented airborne TOW (LAAT) sight will be upgraded.



Above are photographs of a jeep taken during the day unaided (top), the same jeep taken at night through a night vision device based on the principles of image intensification (center), and the same jeep using thermal imagery, or FLIR (bottom).



A close-up of the TADS/PNVS on the AH-64 Apache (inset).

First deliveries are for 1986.

NVEOL, working with the Aviation Systems Command, also is responsible for the current modification work order being performed on Army aircraft to replace red cockpit lighting with night vision goggles compatible blue lighting. The reason for this development is because red light was picked up by the NVG much like white light due to its wavelength characteristics. This led to a glare problem, or blooming. The blue lighting effectively cancels the blooming that was due to red cockpit lighting. Also, blooming due to white light sources outside the cockpit has been reduced because of the sophistication of the third generation, image intensification tubes used in ANVIS. Also, blue lighting allows the Aviator Night Vision Imaging System to be compatible with the FLIR-based PNVS on the Apache.

In a related area, NVEOL is developing two different systems to identify aircraft targets. The *first* is the air defense target identification processor (ADTIP). This system will allow the passive acquisition and identification of targets without betraying its location. The ADTIP is based on laser technology being developed at NVEOL.

The *second* system is the prototype automatic target screener. Thermal imaging is used here as the basis for identifying targets. A computer identifies targets based on their thermal images and it is now capable of human accuracy at faster than human speed.

The people of NVEOL are dedicated to the central concept of force multiplication through the use of technology. They recognize that their technology helps to extend our soldiers' capabilities beyond those of hostile forces. When these force multipliers are Aviation related, NVEOL calls on the EFTA flight test detachment to provide the aircraft and aviators to prove its concepts.

The FTD hangar at Davison AAF.

Flight Test Detachment (FTD)

Major Miles Henselman, the FTD commander, states that, "Our primary mission by charter is to provide Aviation support to NVEOL. But we also provide Aviation support to other governmental agencies when requested and consult with other Department of Defense services and organizations on sensor and night vision device developments and systems. I feel we have an excellent relationship with NVEOL. They work with the technology at the conceptual and developmental levels. We [FTD] get involved with the operational stage of the technology. We assist them in integrating the hardware into the aircraft, and we then test the system for them under the actual flight conditions envisioned for the system. We help to round out the team effort, so to speak.

"The work is extremely interesting and rewarding, both from a professional and personal viewpoint. It is important to remember that some of the basic research work we get involved in is not necessarily applied to a specific item or requirement. A lot of research is done into the use and exploitation of both the visible and nonvisible spectrum of light. So we are exposed to, and work with, technology that is pushing the state-of-the-art, technology for which a specific application may not even be envisioned yet.

"This involvement at the cutting edge of state-of-the-art technology exposes FTD personnel to systems which most people are still dreaming about—or seeing in the movies!"

A project recently undertaken which appears to have come out of Star Wars involves the integration of ANVIS with the HGU-56/P aircrew integrated helmet system (AIHS). AIHS is the proposed replacement for the SPH-4. Why does FTD get involved with a new helmet? According to Mr. Bob Johnston, the FTD project pilot assigned to AIHS, "Our job is to evaluate the integration of ANVIS with this new helmet. There are various features of this helmet we will look at. The chemical defense mode involves a separate mask which attaches to the front of the helmet. We'll see if ANVIS can be used with this mask. A separate blower provides air for cooling and keeps the visors and shields clear. We are interested in seeing if this blown air will help keep

continued on page 42

This is the HGU-56/P Aircrew Integrated Helmet System. This helmet is so new that FTD just received a prototype on 26 April 1985. On the left above is the basic helmet with ANVIS in the stowed position, the maxillofacial shield which protects the lower face and directs cooling air, and the Conversational Communications Unit (CCU) for speaking and listening when wearing the chemical defense ensemble. The item in the center is the chemical defense mask and associated equipment. The item attached to the left hose is an interface for oxygen systems. The right hose is attached to the battery/aircraft powered blower unit with filters in place. This unit will provide not only filtered air for chemical defense, but also will provide blown air in an uncontaminated environment for cooling and to clear the various visors and shields. There will be a mount in the aircraft in which this blower can be placed. Not shown are the dual visors on the helmet and the neck shroud. Below, top row at left shows the ANVIS in the stowed position. The remainder of the top row shows the helmet with ANVIS in the operating position and the maxillofacial shield. The outlet on the left side of the shield will be to direct blown air over the shield to clear condensation (visible in this picture) and provide cooling. Bottom row: Three views of the helmet with the chemical defense ensemble and ANVIS. Mask is in place, blower unit with filters is on the left, oxygen system interface is on the right, and the CCU is over the model's heart. Note that this series shows the shroud employed on the helmet. The CCU allows for intelligible conversations to take place while wearing the mask. Not shown is a water tube inside the mask itself for drinking water in a contaminated environment.

History of the EFTA Flight Test Detachment

1968:
Project Manager (PM), Southeast Asia (SEA) Night Operations, was formed within the existing Night Vision Laboratories (NVL) to provide forces in SEA with a night operational capability to counter Vietcong night operations. Aircraft were gathered at Davison Army Airfield (AAF), Ft. Belvoir, VA, for use in this developmental work. Aviation assets had no specific organizational designation.

1969:
PVS-5 was flown for the first time.

1972:
PM, SEA Night Operations designation was changed to Surveillance, Target Acquisition and Night Operations (STANO) Field Support Group and remained under NVL. This organization was still responsible for fielding night vision systems to SEA. The Aviation element had grown to 45 aircraft and 28 aviators. This element was designated as the Night Operations Training and Test Support Detachment (NOTTSD). It

The UH-1M with the INFANT system installed—Iroquois Night Fighter and Night Tracker. The INFANT was basically a low light level TV system with the M-21 armament system which included a pair of 7.62 mm miniguns and two 7-shot rocket pods. Three of these aircraft were deployed to Vietnam in November 1968 with associated aircrews and support personnel.

continued from page 40

the ANVIS optics clear also. These are just two examples of the many items we will look at. The AIHS is only in the development stage, so currently it is impossible to say what will or will not work. We do know, though, that the custom fit, thermal plastic liner will enhance ANVIS use by reducing helmet rotation tendencies and by increasing wearer comfort. Numerous agencies are involved with AIHS, each with its area of concern. We are working with NVEOL to ensure that this new helmet will be compatible with ANVIS." AIHS has a proposed fielding date of fiscal year 1989.

The airborne mine detection and reconnaisance system (AMIDARS) is another of Mr. Johnston's projects. "This particular system is designed to use thermal imaging technology to detect mines from the air. The reduction in personnel vulnerability should be obvious if this approach proves feasible." AMIDARS is currently in engineering development.

One of the largest projects FTD has worked on, and which is still ongoing in certain areas, is ANVIS. While it has been discussed to some extent earlier, it has not been discussed from a pilot's point of view.

"The advantages of ANVIS when compared to the PVS-5 are really too numerous to list. Obvious advantages such as weight reduction, greater resolution, lower ambient light levels required to work in and a reduction in blooming problems—all these advantages—will help to make ANVIS a welcome replacement for the PVS-5 and gain for it wide acceptance throughout the Aviation community," said Mr. Ken Bly, FTD's primary ANVIS project pilot who has unbounded enthusiasm for these latest night vision goggles. "It really seems impossible sometimes to adequately convey to the skeptical aviator in the field this quantum leap forward in improved performance that ANVIS represents over the PVS-5. But, the other pilots here and I have flown ANVIS in every flight profile and under all weather conditions—to include some situations that were required for testing, but will never be seen by pilots in the field. ANVIS is simply tremendous!"

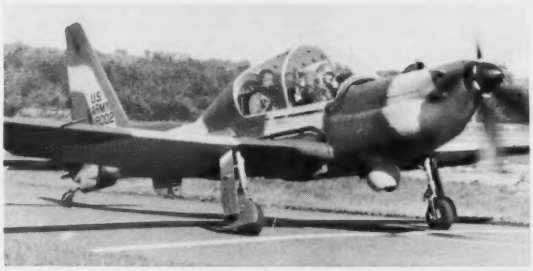
As mentioned earlier also, the TADS/PNVS developed for the Apache was a product of NVEOL. As a result, the FTD pilots were among the first to fly the PNVS. Mr. Bly addresses PNVS: "Recognizing that I^2 was reaching the limits of its technology, PNVS was developed using thermal imagery, or FLIR. There still exists in some circles disagreement over which is better—ANVIS or PNVS. The truth is the two are complementary—there is a very positive synergism when they are employed together."

The development of a system such as PNVS entails many decisions, early in the developmental process, which are taken for granted once the system enters production. However, the pilots are quick to point out that often they are tasked to perform associated testing on systems. A prime example during PNVS development was OPTIC-1. In this test, FTD pilots flew a specially modified AH-1 Cobra to

ested all airborne night vision and target cquisition systems. Major projects included INFANT—Iroquois Night Fighter nd Night Tracker (at left); the Hughes ircraft Company FLIR (forward looking nfrared); and the YO-3A, a quiet surveillance and reconnaissance aircraft at ight.

975:

TANO Field Support Group was reduced in size and incorporated into NVL ith no further designations. NVL at this me was under the Electronics Command (ECOM). NOTTSD was redesignated the Night Vision Support Branch (NVSB). It was assigned to the ECOM Army Aviation Detachment (AAD) at Lakehurst, NJ. but remained at Davison AAF in direct support of the NVL.



The YO-3A which was a surveillance and reconnaissance aircraft specially designed to be "quiet." This was achieved through modifications to the propeller, wings were more suited for a glider, and a muffler system that was beefed-up. Seven of these made it to Vietnam. They were fitted with a suite of FLIR and low light level vision devices.

1978:

ECOM was reorganized into the Electronic Research and Development Command (ERADCOM) and the Communications Electronics Command. NVSB was redesignated the Night Vision Support Detachment under the ERADCOM Flight Test Activity (EFTA) at Lakehurst, formerly the ECOM AAD. NVL was reorganized as the Night Vision and Electro-Optics Laboratory under ERADCOM.

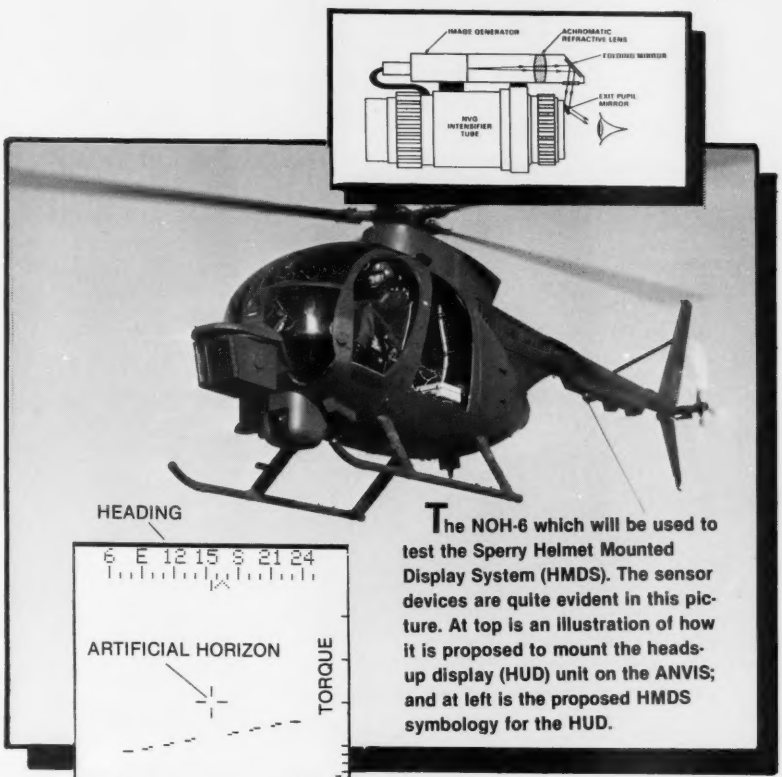
1984:

The Night Vision Support Detachment was redesignated as the EFTA Flight Test Detachment.

evaluate whether the display would be a helmet or panel display. As a result of these tests, the decision was made to go with a helmet mounted display for Apache pilots.

In an associated development, FTD is involved in evaluating the Sperry helmet mounted display system. This is a heads-up display intended for use with ANVIS. The aim is to enhance safety and mission effectiveness by enabling the pilots to remain "outside" the cockpit during night, nap-of-the-earth (NOE) flights. Mission scenarios are low level, NOE and terminal area maneuvers with all flights to be conducted at night. The symbology to be used will provide heading, airspeed, radar altitude, torque and artificial horizon.

These are just two examples of how the expertise of these Department of the Army civilian (DAC) project pilots influence system development. Yet this very fact that the project pilots are predominantly civilian often leads to criticisms that the unit is out of touch with the field. Major Henselman asserts:



The NOH-6 which will be used to test the Sperry Helmet Mounted Display System (HMDS). The sensor devices are quite evident in this picture. At top is an illustration of how it is proposed to mount the heads-up display (HUD) unit on the ANVIS; and at left is the proposed HMDS symbology for the HUD.

"My DAC pilots are assets, rather than liabilities. They have strong military backgrounds; many continue their Army careers in the National Guard. They have particular strong points or areas of knowledge which enable them to work together as a cohesive team. They are all cross-category qualified, flying a wide variety of aircraft under all weather conditions to the edge of the performance envelope — with a piece of test equipment, no less! They also provide a strong, institutional memory to the detachment. The military pilots provide new viewpoints and the latest doctrine from the field as they rotate in and out of assignments here. But finally, we all—military and civilian—fly regularly with operational units during testing of this equipment. We do this under actual operational conditions. We do not operate solely in a sterile, test environment."

The involvement of NVEOL in sensor technology places the FTD in a position to perform missions oriented other than toward night vision. The detachment operates an O-2 (Reims 337G Cessna) to act as a testbed for remotely piloted vehicle (RPV) payload systems developed by NVEOL. These systems are predominantly FLIR, with low light TV cameras and lasers included. The O-2 airplane provides the capability to fly the same mission flight profiles projected for the RPV. As a result of work performed with the O-2 and its FLIR sensor package, a demonstration of the system was arranged for the Southern Command. While conducting demonstrations is a common mission (others have taken place at Ft. Hood, TX, and in Germany), the requirements for the demonstration were not. The aircrew was going to have to fly out of unimproved strips under blackout conditions with night vision goggles. In preparation for this mission, extensive training was conducted at Ft. A.P. Hill, VA, using a dirt strip used by C-130s for training. On 27 August 1984, the first completely blacked-out flight under night vision goggles was accomplished by an FTD aircrew. After checking with the Army Materiel Command, FTD believes this was the first actual fixed wing NVG flight in the Army under total blackout conditions!

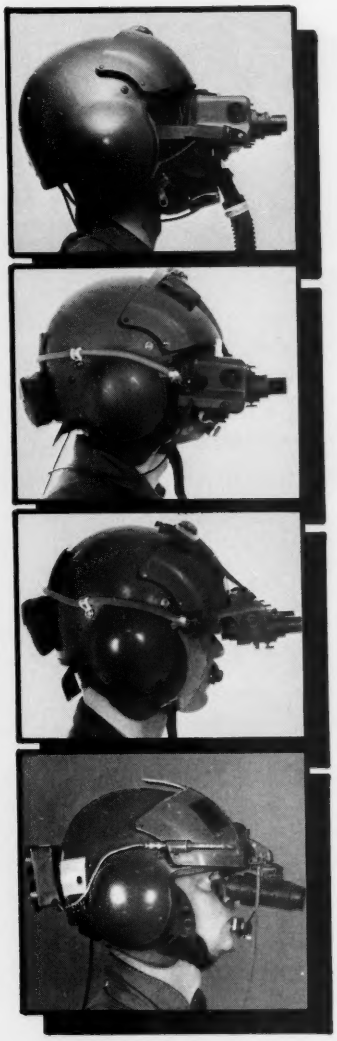
These photographs show the first RPV FLIR mission payload system mounted on the 0-2A for testing with two varieties shown.

Readers may believe that there are no problems filling the *military* pilot slots at FTD considering the type of work they perform. Yet this is the major problem Major Henselman feels he is up against. "My biggest worry since assuming command seems to be trying to find military pilots to come here. I cannot believe that the type of work we perform here is unattractive. This work represents the leading edge of Aviation sensor development. People just do not realize that there are units such as this detachment to which they could be assigned.

"I am currently looking for research and development oriented aviators to fill captains' slots. We also have a maintenance officer position which will be vacated soon. Of course, I feel that a prospective aviator should be experienced and versatile. And, while not a strict necessity, it would help if the aviator had a basic knowledge of test plan formulation, requests for proposals, proposal evaluations and contracts."

A final service which FTD provides to NVEOL and to other organizations is basically Aviation related consultation. With the breadth of knowledge and experience contained within FTD, the pilots are often sought for their opinions and input into future projects. The most obvious example of this currently is that one of the DAC pilots is on the working group for virtual cockpit concepts for the light helicopter family (LHX). FTD became involved with LHX as early as 1983 when it provided a representative to an LHX Advanced Rotocraft Technology Integration Systems meeting at the Applied Technology Laboratory at Ft. Eustis, VA.

No matter how you look at it, NVEOL and FTD face new challenges every day—or night! In the increasingly critical business of developing round-the-clock Aviation capabilities, new frontiers of technology are continually being conquered and put to the test. By a mutuality of purpose, understanding of goals to be achieved, and an integration of efforts toward those goals, the Night Vision and Electro-Optics Laboratory and the EFTA flight test detachment truly are joining forces in the "Conquest of Darkness" to provide that critical combat edge.



Night Vision Goggles Articles

- "Helicopter Low Level Night Operations," LTC George W. Moses, May 1973, page 2.
- "How Night Becomes Day," MAJ Charles D. James, May 1973, page 26.
- "NOE at Night," March 1974, page 2.
- "ACTAAT: NVG Qualification," July 1982, page 21.
- "Knights Train For The Night," MAJ Frank L. Carson and CW3 Owen D. Scruggs, September 1982, page 3.
- "NVG Counterbalance System," MAJ Vincent P. Jones, March 1983, page 26.
- "Modified Face Plate Goggles," CW2 James A. Gunning, May 1983, page 2.
- "AN/PVS-5 Night Vision Goggles, What You Gain, What You Lose," LTC Roger W. Wiley, LTC David D. Glick, USAF (Ret) and MAJ Frank F. Holly, May 1983, page 7.
- "ANVIS—Now a System Designed for Aviators!," Mr. Tim Neal, May 1983, page 12.
- "Safe Mission Completion Using AN/PVS-5 Night Vision Goggles," MAJ Ronald A. Huether, May 1983, page 19.
- "Unaided Night/Night Vision Goggles Training for the Army National Guard," CPT James M. Sikes, December 1983, page 33.
- "The Care and Feeding of Night Vision Goggles," CPT (P) Jeffrey R. Murray, December 1983, page 37.
- "Night Vision Goggles Combat Effectiveness," CW3 Charles L. Murphy, January 1984, page 26.
- "ATC Action Line: Lights Out Night Vision Goggles Training," July 1984, inside back cover.
- "DES Report to the Field: Night Vision Goggles Training and Operations," September 1984, page 24.

This is a time of change within our Army. Recent years have witnessed the implementation of Army Aviation as a combat arms branch, the adoption of the regimental system, and the fielding of sophisticated equipment such as the M-1 Abrams tank and the Bradley family of fighting vehicles (M-2 and M-3). Conversion from "H" series to Army of Excellence organizations is an ongoing process. In the near future, we will witness the formation of the new light division and the activation of the first AH-64 Apache attack helicopter battalion.

Amidst the turmoil inherent in these beneficial changes, stands the soldier; the commander who must train his soldiers to maintain and fight new equipment and new organizations; the logistician who struggles to keep the books balanced; and the plans officer who must redraw operations plans based upon new organizations and missions. Within this environment, it can be all too easy to allow change to become a driving force and to lose sight of the underlying reason that drove the change at its inception. Possibly the greatest challenge to today's Army leader is to prevent change from becoming the focus, to see beyond to the goal of creating a cohesive fighting force, trained and equipped to fight and win anywhere in the world.

We in the maneuver arms (Infantry, Armor and Aviation) must dedicate ourselves to the "concept of team," a group of individuals who have been molded together into a cohesive whole that directs all of its efforts toward a singular purpose.

The Armor article (page 2) and the Infantry and Aviation articles, which follow in August and September, will provide the reader with our thoughts on how the team of maneuver arms will function in combat in a variety of environments and levels of conflict. The understanding, communication and coordination outlined in this series is essential if our team is to achieve the standards of excellence which we need. We in the maneuver arms schools are working together to provide the tools which commanders require to build the concept of team. Doctrinal publications, field manuals and field circulars, battle drills, standing operating procedures and Army Training and Evaluation Programs are being published which emphasize the employment of all of the maneuver arms as a coordinated team. The instruction in our schools is designed to ensure our leaders understand the systems and organizations contained within the maneuver arms and how these assets are molded together to achieve synergy in combat.

We recognize that in the end, it will be the individual commander who achieves the ends we seek. It is you, the leader, who will apply the fundamentals we have provided and through your skills, understanding and initiative, will mold the team to fit the battlefield upon which you fight. The focus of team must not be ignored or lost in the day-to-day details of maintaining equipment and of training and caring for soldiers. It is no easy task for a commander to coordinate training outside of his battalion or brigade, to ensure that his junior officers and noncommissioned officers have the opportunity to work and train with other maneuver arms. But, the penalty for failure to do so is too high. It is the loss of the concept of team and it is defeat in battle.

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